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**Editor-in-Chief
Dr. S.K. Bhatia**



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Would like to appeal to the learned readers to send us their views, counter views, suggestions, comments, and observations etc. via “Letters to Editor” (which will be published in the next Issue) on the articles published in this Journal so that an academic discussion may start and our efforts may become more participative and thereby more meaningful and interesting.

Editor-in-Chief

The Themes for the next Issue Jan-2024

Section I.

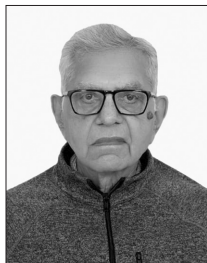
1. Valuing professionalism and training in Teacher Education courses.
2. Changes in perspectives on areas of research in Teacher Education.
3. Perspectives on how learning in Curriculum and Pedagogy are demonstrated in Teacher Certification Programs.
4. Perspectives on effective Evaluation Practices in Teacher Education Programs.
5. Innovations and Innovative practices in Teacher Education Programs.
6. Diversity and Inclusion: Different International perspectives.
7. Ensuring access and equity in high quality Teacher Education programs.
8. ICT-related Innovations and practices in Teacher Education Programs.
9. Policy Perspectives in Teacher and School Education.
10. Reports on related conferences, seminars and workshops, including International offerings.
11. The Prolonged Online Mode of Teaching-learning - Challenges, Innovative experiments, Findings.
12. Tailored Interventions in Learner-centered Education.
13. Blended Learning as an outcome of Online Learning during the ongoing pandemic.

Section II. Innovative Experiments in Schools:

1. Teachers’ Professional Growth
2. Optimising Students’ Achievement
3. Holistic Learning
4. Experiments in the area of Experiential Learning.
5. Objective Evaluative Strategies During the Prolonged Closure of schools.
6. Solving School Problems through Action Research
7. Measuring Students’ all-round Achievements through Ensemble assessments.
8. Literacy and Numeracy Challenges and their Remedies in schools

Thanks and Regards
Editor-in-Chief
Dr. S.K. Bhatia

Editorial



It gives me much pleasure in presenting the July 2023 issue of International Journal of Teacher Education and Teaching. It is heartening to note that the Corona-impacts on the restraint of receiving adequate numbers of quality papers and articles is disappearing and the trend of normalcy is being restored. Though the Corona has not yet been completely rooted out, its ill-effects, now, are not as severe as these were there in the first few waves. Schools have restored their functioning, whereas higher-level institutions are still adopting the blended mode the world over and it may continue as long as its optimum benefits are being reaped. It is also a fact that the complete academic recovery from the Corona-effect will take some more time.

When the pandemic-effect on research papers and articles is analysed, it may be said that pre-pandemic academic era is not yet fully restored, but it is also true that different waves of Corona led many academicians to bring out some technological innovations and precautionary measures to continue with the positive efforts in the field of education. Though much loss of study and research time has taken place, the emerging technological offshoots facilitated the teaching-learning transaction as well as the conduct of research studies. Though face to face interaction, for teaching-learning discourses and for seeking answers to research questions, has no alternative device, but students and researchers had to and are still depending on digital devices for getting their work done. The academic proceedings have been delayed but not stopped. The proof of this may be gathered from the bustling atmosphere prevailing in schools and the different modes of teaching-learning activities going on in higher-level educational institutes. Another proof of the academic pursuits, being carried on, may also be derived from the overwhelming number of papers and articles received for the present issue of the journal.

The Editorial Board of the International Journal of Teacher Education and Teaching is of the view that unrestricted freedom should be given to the authors to flourish optimally in the stream of their interests. They should be encouraged to explore the truth in the direction of their thinking and unexplored areas of teacher education research, as also to report the findings of the steps taken to make schools qualitatively more fertile. With this thinking in view, a long list of themes, pertaining to teacher and school education, was circulated, inviting the scholars to pen down their views and research findings in the areas of their interests. The contributors, not only, concentrated on the suggested areas, some of them went across this list and offered many efficient solutions in furthering the cause of improving curriculum transaction, modern learning, and 21st century innovative academic advancements.

The articles and papers approved for the present issue are mainly in the area of teachers' job-satisfaction, Innovative Pedagogical Practices, School Administrative Practices, Learning Modalities, Enhancing subject specific Performance, Software Applications for instructional delivery, Science Learning for visually Impaired students and so on. The authors have done an excellent job by making inclusive classes more effective by contributing the paper "Breaking Barriers: Making Hands-On Science Learning Accessible for Students with Visual Impairment at Middle Stage." There is further scope of innovating rich articles in the area of teacher and school education. We still feel the shortage of papers on school projects. Many schools undertake projects on improving teaching-learning practices, involving improving teaching strategies and resulting in better students' achievement. Many schools excel in involving more and more students in their aptitude-based co-curricular activities and furthering the steps of improving life-skills. Our journal, eagerly, looks for incorporating the compact-reports of all such innovative practices.

Most of the papers published in the present issue are research-based. No doubt these are genuine and properly researched, but the Editorial Team will still be interested in those papers, the findings of which help in productivity, human welfare, unity in diversity, democratic outlook, better teaching-learning strategies, better evaluative practices and above all the holistic learning devices.

Some burning problems being faced by the international community today are the initial goals of safeguarding peace, protecting human rights, enhancing employability, establishing the framework for international justice and promoting economic and social progress. Along with advancement in pedagogical issues,

content-enrichment, students' attitudinal and aptitudinal enrichment, it will be desirable that our authors look forward to finding the solutions of the problems mentioned above.

Some very deep-rooted problems are being faced by many children, particularly in under-developed and developing countries. These are the challenges of literacy and numeracy. These are there not only because of low intelligence, but also due to the disadvantaged parents, ill-equipped schools, deficient teachers, poverty and social disorder. The disadvantaged children in this respect always lag behind in any of the pursuits of social and economic forwardness. Therefore there is a dire need to find out ways and means to solve such problems. Whereas we encourage the scholars to develop articles and papers in their areas of interest, our humble request to the scholars is also to engage themselves in finding ways and means in solving such problems and sharing their experiences through their well-knit papers and articles through our journal.

Dr. S.K. Bhatia
Editor-in-Chief

Contents

Research Articles

- 1. Adopting a Pedagogy of Multiliteracies for Multimodal Assessments in the BGE English Classroom 10**
Emma J. Van Dinter
- 2. The ‘Clogs in The Wheel’ of Development of School Administration in Nigeria 30**
Victor Olugbenga AYOKO
- 3. Business Education Software Applications for Instructional Delivery among Business Education Lecturers in Universities..... 39**
S. Hayatu, Prof. H. Bello, Prof. A. A. Deba and Prof. B. S. Dalhat
- 4. Self-care as a Predictor of Job Satisfaction amongst Educators..... 47**
Macey D. Kohls, Jordan S. Amundson, Kenzie J. Hedlund and Jennifer M. Joy
- 5. Determining Lecturers’ Test Scoring Knowledge by Level of Working Experience: A Case Study of Tertiary Institutions in Zamfara State..... 53**
Bashir USMAN and Ocheola INNOCENT EWAOCHÉ
- 6. Early Retirement Among Teachers In Malaysia: Perceptions and Impact on Teaching Profession 61**
Jill Ling, Fetylyana Nor Pazilah and Ong Sing Ling
- 7. “Chipping the Genes”. Game-Based Learning Approach in Genetics-A Case of Monohybrid and Dihybrid Crosses and Interpretation..... 72**
Glaiza P. Alair and Carmen P. Guilaran
- 8. A Study of the Significance of Massive Open Online Courses (MOOCs) for the Professional Development of Prospective Teachers of Undergraduate Teacher Education Programme 82**
Dr. Amit Ahuja
- 9. Challenges Encountered in Designing Intervention Materials in the New Learning Modality of Adlay National High School, Division of Surigao del Sur 91**
Remyson C. Trugillo, Edsel D. Aspillaga, Mafit

10. Towards Discovering the Best Learning Strategy in Developing Student's Problem-Solving Skills in Mathematics	101
Camus, Karine Jane Belleza	
11. KAES-GURO: A Mentoring Program in Improving Students' Reading Proficiency.....	117
Princess Jane Pandi-Ruedas and Julieta T. Canda	
12. Skills Training on Bread and Pastry Production an Extention Program	125
Mark Jonnel S. Ilagan	

Innovative School Experiments

13. Breaking Barriers: Making Hands-On Science Learning Accessible for Students with Visual Impairment at Middle Stage.....	134
Dr. Anjni Koul and Dr. Ashish Kumar Srivastava	
14. Enhancing Academic Performance in Mathematics of Grade 11 Students through Pre-Recorded Lesson and Home Tutorial Session.....	150
Neilkim-Peter J. Tapado	
15. Assessment of Academic Achievement of the Grade 11 Students in General Mathematics	161
Raymond D. Garcia	
16. Students' Perception about Collaboration, Social Interaction, and Flexibility in Flipped Learning: a Study.....	174
Ilfa Zaidi, Mirza Shahzan Asagar and Harjeet Kaur Bhatia	
17. Students' Reactions to Teacher's Written Feedback in the ELT Classroom	185
Ailyn C. Caballero	

RESEARCH ARTICLES

Adopting a Pedagogy of Multiliteracies for Multimodal Assessments in the BGE English Classroom

Emma J. Van Dinter

Abstract

This small-scale, qualitative action research explores the impact of a Pedagogy of Multiliteracies (New London Group, 1996) and a multimodal approach to assessment within a Scottish Secondary BGE English classroom, including the effect of teaching and learning resources, their influence on the design of multimodal assessments, and an analysis of the multiliteracy skills assessed in pupil-produced texts. The triangulation of a practitioner journal, pupils' multimodal texts and reflections highlight aspects of effective multimodal assessment design, the impact of the assessments on learning and meaning-making, and the effectiveness of a multiliteracies approach to multimodal assessment practice.

A Pedagogy of Multiliteracies demonstrates how a variety of modes are used together to communicate meaning and supports a new way to develop inclusive assessment practices. Assessment of pupils' texts suggests that the design/re-design cycle (Janks, 2010) is an impactful aspect of a multiliteracies approach, influencing students' understanding of multimodal teaching, learning, and assessment resources.

Key Words: Multimodality, Pedagogy of Multiliteracies, Assessment, English Education, Literacy Education, Inclusive Education.

Literature Review

Traditional aims of 'mere literacy' (New London Group, 1996, p.64) education focus on the accuracy with which a written assessment is completed and determines at what level a pupil is working. However, exams and other 'mere literacy' assessments do not give an accurate representation of the range of skills students use to decode, make sense of, produce and create texts.

A gap between the old 'mere literacy' approaches and the current aims of literacy education, as expressed by Scotland's Curriculum for Excellence (CfE) (2010), exists. Although the CfE has an open vision for the BGE year groups and requests innovative approaches to education, Scottish educators prioritise traditional literacy skills. This is demonstrated by using monomodal assessments as key determinates of student progression. Considering literacy education and determining a pupil's understanding of English concepts in this way may be inaccurate. Young people experiencing barriers to reading and writing are not served by current assessments. Thus, monomodal assessments may be creating situations of inclusivity within Scottish English classrooms.

The New London Group (1996) highlights the need to include multimodality in Literacy Education. *Literacy* and *being literate* are in constant transformation, pushing educators to find "new ways to engage

Emma J. Van Dinter, Teacher of English, Scotland

with multimodalities and new technologies” (Albers, Vasquez, & Harste, 2017; Comber, 2016; Marsh, 2017, 2018; Vasquez, Woods, & Felderman, 2019; Pandya, 2019 et al Vasquez, 2019). Literacy pedagogy continues to focus on reading and writing “... formalized, monolingual, monocultural, and rule-governed forms of language” (New London Group, 1996, p.1). The pupils’ ability to do this is to demonstrate their being *literate*. Although necessary, traditional literacy is not “sufficient for the development of the kinds of literacy practices” of today (Unsworth, 2001, p.7).

A Pedagogy of Multiliteracies suggests that being literate involves more than reading and writing. Text design and production are foundational to this pedagogy and utilise multimodality to create meaning (New London Group, 1996). Pupils designing a text go beyond “practicing a skill” as they navigate the re-design process and find answers to questions which allow them to “let those texts do the work intended” (Vasquez, 2019, p. 306). The outcome is insight into students’ critical approach to conveying meaning significant to them.

Defining a Pedagogy of Multiliteracies and Multimodality

Multimodality involves drawing upon visual, audio, gestural, linguistic, spatial, and temporal aspects of communication needed to create and make meaning (Govender/ UKLA, 2020; Hawkins, 2018; Jewitt, 2017; Jewitt, 2008). It is a response to the changing social and semiotic landscapes where meanings are made, distributed, interpreted, and remade through a variety of representational, communicative resources and culturally relevant modes.

A *Pedagogy of Multiliteracies* illustrates how a variety of modes, beyond written language, are used together to communicate meaning. It suggests that our understanding, the meaning we create and get from diverse communicative methods, has cultural and social implications (New London Group, 1996). It also suggests that being literate includes the ability to make meaning across modes and being able to use multiple modes to communicate ideas in a variety of social spaces.

They feed into each other and function in what is known as the design/re-design cycle (Janks, 2010).

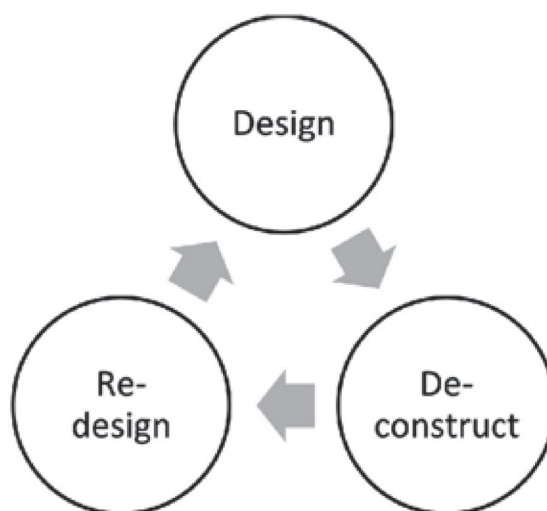


Figure 1: The Design/Re-Design Cycle

Hilary Janks' design/redesign cycle (2010) focuses on multimodality and can improve understanding of student-produced texts. Students must learn "how to use and select from all the available semiotic resources for representation to make meaning" (Cope & Kalantzis, as cited by Janks, 2006, p.4).

- **Design:** The creation or production of a multimodal text (New London Group, 1996).
- **De-construct:** To dissect a text into semiotic parts (New London Group, 1996).
- **Re-design:** To construct a new text based on original designs which has a new meaning.

Multimodal assessment practice puts students in the shoes of a designer: They create meaning based on representations and recontextualization of teaching and learning materials with consideration of their identities and cultural needs.

The globalisation of communication brings to light the relevant modes, methods, and semiotic resources required to participate within and across communities (Hawkins, 2018). Semiotic resources which support our conducting and interpreting of meaning are socially and culturally significant – the relevancy of modes is shaped by the meaning-making needs of both a global society and its respective subgroups (Hawkins, 2018; Bezemer & Kress, 2008; Van Leeuwen, 2004).

Multimodality is a response to changing social and semiotic landscapes. As communicative modes change, so does our understanding of multimodal texts. Thus, literacy and literacy pedagogy definitions may encompass one's ability to perform effective multimodal communication (Lim, 2018; Jacobs, 2013).

Multimodality, Inclusive Education, Social Justice

Multiliteracies Pedagogy is effective due to its pluralism. It encapsulates and weighs other theories, such as Critical Literacy Pedagogy equally, and engages learners with their values, identity, and power through their design and creation of multimodal texts (Turner & Griffin, 2019; Janks, p 245; Jewitt, 2017; Jewitt, 2008). 'Design' and 'creation' are key.

Thus, Pedagogy of Multiliteracies and multimodality supports social justice. For example, learners naturally seek, collect, and share communicative modes from outside the classroom within the classroom environment. Engagement with teaching and learning content is improved by learners' ability to connect and apply their learning to their lives (Govender/UKLA, 2020). This suggests learners' autonomy and collaboration are bound together. The formal learning environment remains situated within a wider world of *being* and *doing*.

Doing the design/re-design cycle is significant as curriculum content and representation shape both what is to be learned and how it is to be learned (Jewitt, 2008). If multiliteracies are required to navigate and communicate across communities, assessment practices must meet students' needs to participate accordingly.

Multimodal Assessment Possibilities

Assessment cannot validate only one mode of meaning-making if we are literate in a multitude of ways. Monomodal assessments have "resulted in many misleading narratives" about learners (Lawrence & Mathis, 2020, p.1). It suggests the exclusion of a range of student abilities and interests within the classroom (Au & Tempel, as cited by Lawrence & Mathis 2020; Delpit, as cited by Lawrence & Mathis, 2020). Educators

“risk missing and undervaluing the meaning-making and learning potentials of a multimodality approach” (Shipka, as cited by Bourelle, 2018, p.18) to assess learning as they focus on “checklists that assess isolated skills” (Lawrence & Mathis, 2020, p.1; Tan, 2020).

To understand the implications of Multiliteracies Pedagogy, it is necessary to assess pupils’ work using a multimodal method. A Pedagogy of Multiliteracies’ allowances offers a range of starting points that engage learners’ identities, individualise learning, “allows for divergent learning orientations”, and promote using varied “modalities in meaning-making” (Cope & Kalantzis, 2009, p.188). Thus, multimodal assessments may improve accessibility.

Multimodal assessments might allow educators opportunities to recognise how learners critically design new texts and make sense of materials. However, we are left to question: how can educators assess a piece of student-produced work which offer so many allowances?

It is suggested that linking “multimodal skills development and assessing properly is messy and akin to opening Pandora’s Box” (Pandya, 2012, p. 183). However, monomodal assessments create barriers for students to demonstrate their knowledge and skills. This is where education is: stuck in the middle of acknowledging the clear relevance of multimodality, and comfortably using traditional assessments.

Research Questions

1. How are effective multimodal assessments designed and what are their key characteristics?
2. What does a multimodal approach to assessment allow learners to practice, and how does pupil-produced work align with the assessment task?
3. How do practitioners engage with multimodality and multimodal practice, and what are the implications of adopting a multimodal assessment process for educators’ professional practice?

Research Design

Using an action approach to gather qualitative data, this study follows twenty students from a second-year, mixed-ability BGE class in Scotland’s Inverclyde area during the 2021/2022 school year. The students studied three poems and then completed a multimodal assessment focusing on imagery techniques found in the poetry. The question prompt is informed by National 5 past paper questions but adapted appropriately for the age and stage of the BGE learners.

Data Collection

Qualitative data was gathered through an ongoing practitioner journal, through the work pupils produce in response to formative and summative assessment tasks, and through learners’ reflections on the assessment process. Triangulation of data was completed. Data set one account for the design of the materials, drawing together research, theory, and teaching practice; data sets two and three include the pupils’ work and responses. Common themes and patterns found during the analysis of the data can help build a theory about how Multiliteracies Pedagogy can inform a multimodal assessment process.

Learning and Teaching Resources, and Assessment Design

The key activities and resources for constructing the assessment process are outlined in Figures 2 and 3. Figures 4, 6, and 7 are examples of teaching and learning resources. Figure 5 pictures an outcome of a group visual-metaphor task. All the assessment steps offer students “to draw on and extend their range of semiotic resources” (Vasquez, V.M., Janks, H. & Comber, B. 2019, p. 302).

Lesson Topics	Activities	Multimodal Resources
The Study and Analysis of ‘The Clown Punk’	• Reseaching background and context • Indentifying and annotating poetic technique • Answering questions regarding meaning of poem lines • Identifying themes	• Powerpoint presentation • Video montage of poetry reading • <i>Smithsonian</i> video • Amitage’s website • Small group and whole class discussions • Smartboard use for notetaking, annotating
The Study and Analysis of ‘Give’	• Reseaching background and context • Indentifying and annotating poetic technique • Answering questions regarding meaning of poem lines • Identifying themes • Reviewing tone, criticle and sympathetic language	• Powerpoint presentation • Video montage, reading of poem • Word Cloud image observation and discussion • Word choice group table creation, positive and negative connotations • Smartboard notetaking and annotating images, tables • Text colour variety to highlight punctuation • Photos of homeless peoples’ cardboard signs to prompt theme discussion • Whole class discussions
The Analysis and Study of ‘Out of the Blue’	• Reseaching background and context • Indentifying and annotating poetic technique • Answering questions regarding meaning of poem lines • Identifying themes • Reviewing subject and perspective	• Viewing images of the 9/11 attack and 9discussing the emotional response to ‘The Falliing Man’ • Video resources: short documentary on the photography; viewing news and other videos which include different perspectives • Listening to the reading of the poem with a series of images • Group discussion regarding the significance of the poem’s title • PowerPoint presentation including symbols, images, words • Notetaking on board, annotating PowerPoint slides and images

Visual Metaphors	• Reviewing imagery techniques • Defining visual metaphors and providing exemplar • Group discussion Think—Pair—Share type task to answer: what photo goes best with the given phrase to create a visual metaphor? • Group task—Images to Imagery: pairing lines of imagery from the poems with pre-chosen images and justifying reason for combination	• PowerPoint slides for think-pair-share visual metaphor activity: images, words combined; small group discussion, whole class discussion • Two A4 papers, one with six photos and the other with six lines of poetry from the studied poems; used to create a new multimodal design • Group discussion
Creating a Visual Response: Multimodal Assessment	• Review questions prompt for final assessment • Review task steps: a visual and a written response • Review exemplar of image and poetic line pairing • Review exemplar of written response and guiding questions • Reflection task	• Exemplar of assessment outcome displayed on the board, including a variety of photos and three lines of poetry • <i>National Geographics</i> magazine • Written response exemplar on PowerPoint slides with text colours chosen to correspond to different questions

Figure 2: Lessons, Tasks, and Multimodal Resources.



Figure 3: Multimodal Teaching and Learning Resources Design
PowerPoint slides for Simon Armitage's *The Clown Punk*

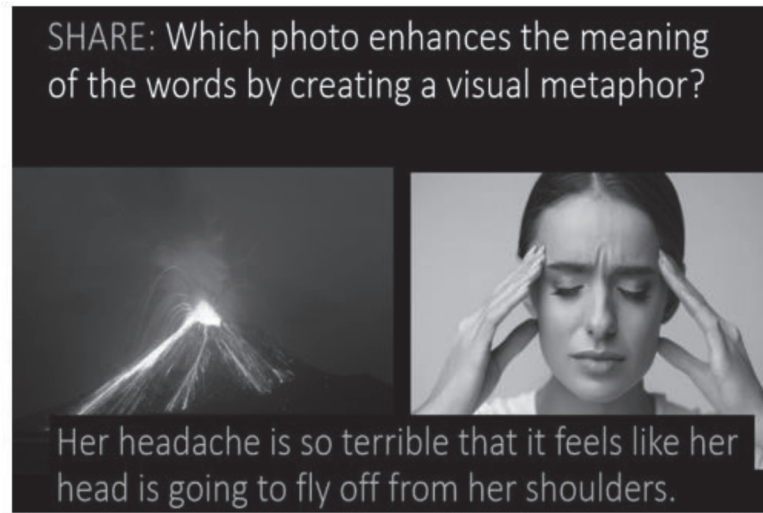


Figure 4: Multimodal Teaching and Learning Resources Design PowerPoint Slides from a Lesson on Visual Metaphors

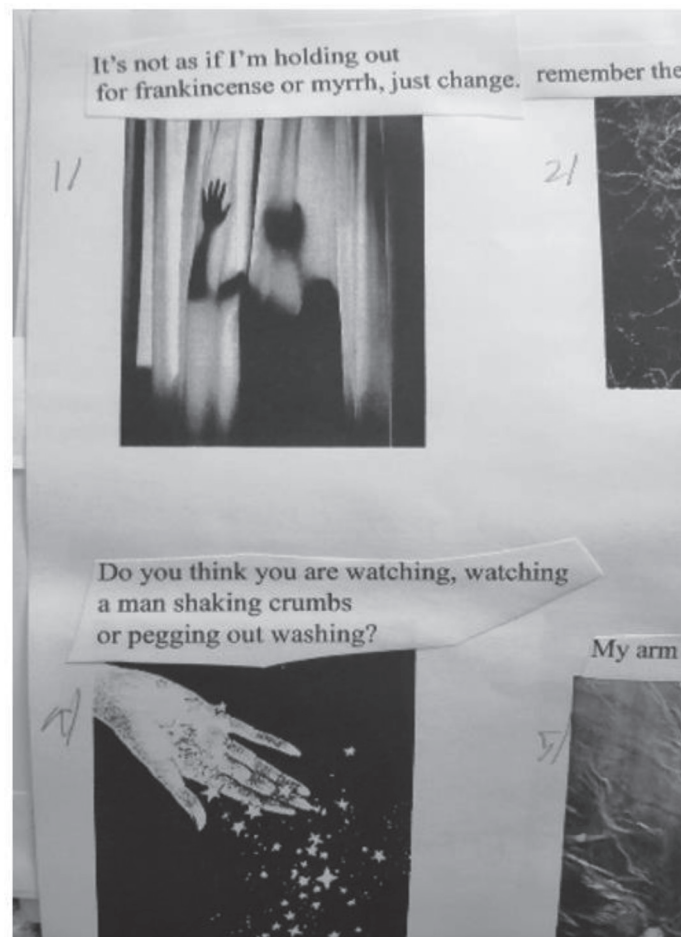


Figure 5: Multimodal Teaching and Learning Resources Design Visual Metaphor Group Task Activity.



Figure 6: Multimodal Assessment Visual Response Exemplar

Students chose images from *National Geographic* magazines and a line of imagery from each poem to create three visual metaphors in response to the prompt: *Simon Armitage effectively uses imagery throughout his poetry to explore different themes. Select one example of imagery from each poem and discuss why it is effective.* By restricting this area of the approach, students critically engaged with unfamiliar texts. Students justified choices in their writing; this component outlined *why* and *how* students made meaning (Figure 7).

Simon Armitage effectively uses imagery throughout his poetry to explore different themes. Select one example of imagery from each poem and discuss why it is effective.

Written Response Example

In the poem 'Out of The Blue', Simon Armitage uses imagery and a rhetorical question in this line. The image that is created is of desperate people hoping to be rescued. In my visual response, I used candles because some people light candles in churches when they pray for the redemption of others' souls. This is an effective example of imagery because it asks the reader to be reflective and question why some people have to suffer while others do not.

- 1) What poem does the line come from?
- 2) What image does the line create?
- 3) How does this compare to your chosen image? Why did you choose the picture?
- 4) Why is the imagery effective?

Figure 7: Multimodal Assessment Written Response exemplar.

Findings and Data Analysis

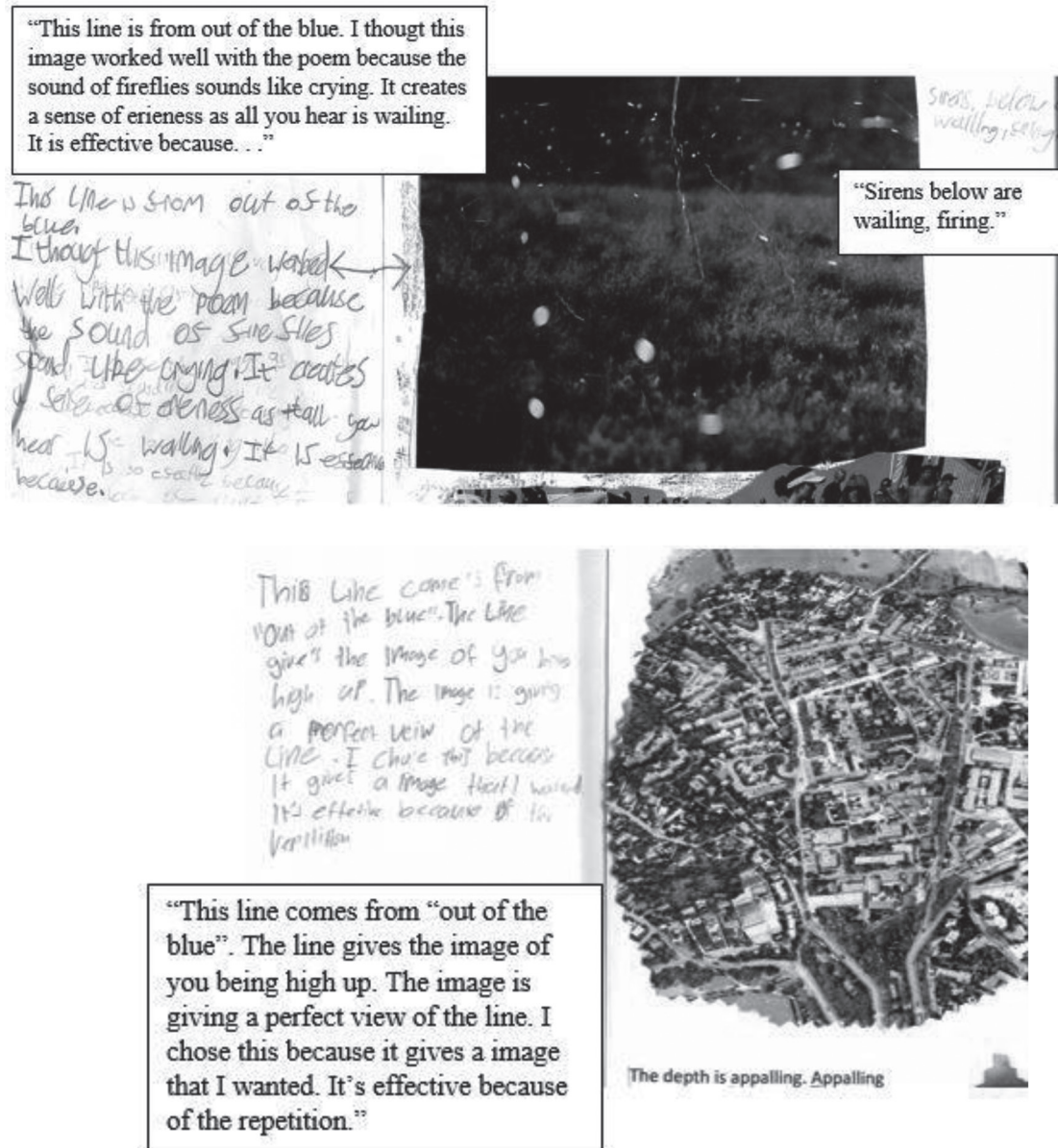
The pupils participated in the design/re-design process throughout the poetry unit by deconstructing existing designs into their semiotic parts and re-designing their understanding in response to a multimodal assessment task focused on imagery (Vasquez, V.M., Janks, H. & Comber, B. 2019; Janks, 2010; Kamler, 2001; Luke, 2013 et. Vasquez, 2019).

Pattern	Image Related	Writing Related	Layout Related	Assessed Work in Pupils'	Percentage of Pupils (%)
One photo used per poem	x		x	11	55
Using two or more photos per poem	x		x	9	45
Layering images	x		x	7	35
Using a variety of images to explore different perspectives	x	x	x	6	30
Connecting unrelated images	x	x	x	9	45
Mixing images with common focus	x	x	x	10	50
Using images for liter and figurative explanations	x	x		83	15
Outside knowledge influential, knowledge from daily life applied	x	x	x	9	45
Photo(s) connects to poetic techniques and word choice	x	x	x	9	45
Manipulating photos: drawing on them	x		x	3	15
Manipulating photos: cutting to pieces and combining	x		x	6	30
Sequencing photos with numbers	x	x	x	1	5
Focus on action in photo(s)	x	x		7	35
Justifying image(s) choices	x	x		18	90
Justification supports poetic analysis	x	x		14	70
Imagery specific terminology used in analysis		x		9	45
Explanation of multi-image use purpose	x	x	x	7	35
Audience reaction to poem considered	x	x		11	55

Writing includes connotations of word from poem line	x	x		5	25
Focus is on the subject's experiences	x	x		17	85
Considers a variety of ways to read the poetry		x		6	30
Images contrast ideas in writing	x	x		1	5
Explores and pairs ideas from poetry to one more aspects photo(s)	x	x		16	80
Makes thematic connections		x		5	25
Focus on techniques beyond imagery and theme		x		7	35
Increased writing amount		x		9	45
Writing in small segments		x		2	10
Writing in large paragraphs		x		16	80
Very little to no writing, only poem line and image pairing		x		1	5
Use of symbols (arrows, lines) to direct reader's viewing	x	x	x	14	70
Book like production			x	5	25
Creation of a table	x	x	x	1	59
Poem line as caption to image	x		x	12	60
Poem line off to side of image	x	x	x	7	35
Photos central, in middle of page, with words on the side	x	x	x	12	60
Analysis encompasses image(s)	x	x	x	3	15
Analysis and images on different pages	x	x	x	7	35
Change in layout choice clearly identifiable between sections, improving reader impact.	x	x	x	2	10
Images not central on paper	x	x	x	4	20
Use of colour be connect to poem	x	x	x	1	5

Figure 8: Patterns of Multimodal Design Moves in Learners' Final Assessments.

The patterns found in students' work related to three key areas: the image (pictorial mode), the written work (linguistic mode), and layout (spatial mode). The table suggests that the pupils' pairing of images to poetic lines affected the writing and layout. How a student manipulates an image highlights consideration of the mode's ability to create meaning. Justification of design choices demonstrates knowledge of affordances while also allowing the assessment of 'mere' literacy. Finally, the layout illustrates that pupils consider the audience of their text.



Figures 9-10: Multimodal Assessment Texts Produced by Pupils Experiencing Barriers to English and Literacy Learning. Written Responses in Text-Boxes are Unchanged from Pupils' Work.

The following examples confirm that a Pedagogy of Multiliteracies offers a range of starting points to engage learners to find meaning in what they are being taught (Cope & Kalantzis, 2009).

PUPIL A

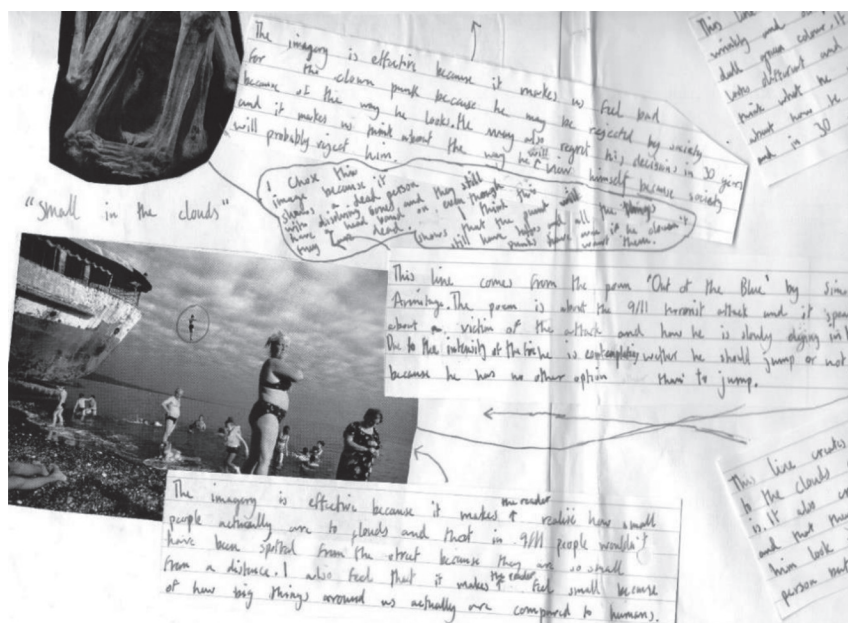


Figure 11: Pupil A's Layout Multimodal Text.

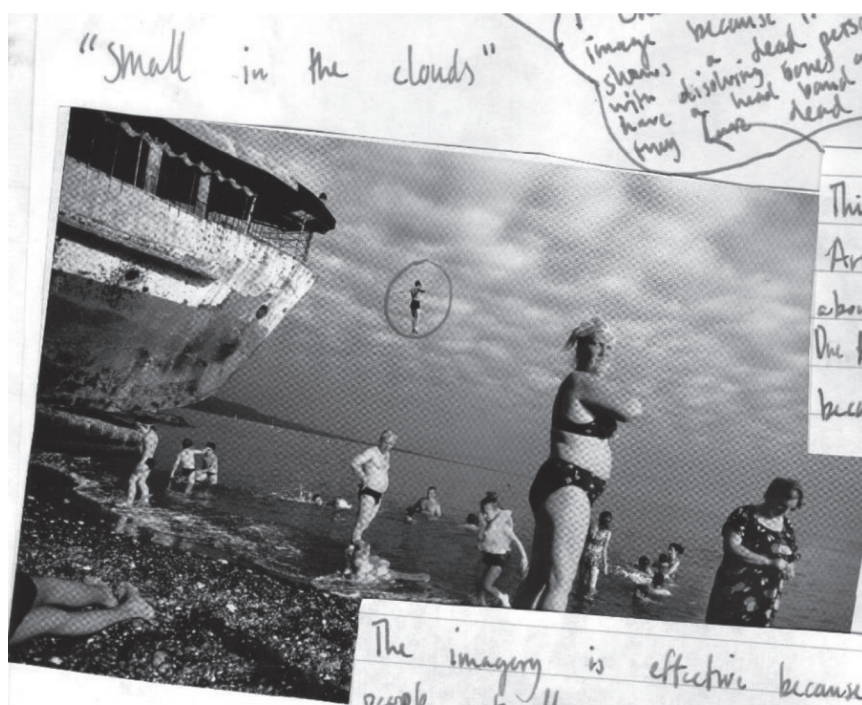


Figure 12: Pupil A's Chosen Photo and Poem Line Multimodal Text.

Pupil A pairs an image of people on a rocky beach next to a rusty boat, and one person is jumping from the boat and is in mid-air, with the line “Small in the clouds” from Armitage’s *Out of the Blue* (2008).

“I chose this image because it shows a man floating in the clouds and compared to the other people on the beach he looks small. . . the imagery is effective because it makes the reader realise how small people actually are to clouds and that in 9/11 [context of poem] people wouldn’t have been spotted from the street because they are so small from a distance. I also feel that it makes the reader feel small because of how big things around us actually are compared to humans.”

Figure 13: Extract 1 from Pupil A’s Written Response Multimodal Assessment.

Pupil A drew a blue circle around the individual jumping from the boat, emphasising the focus and conveying the importance of this subject in the image. The pupil critically considered the available image and how to enhance the reader’s understanding of the purpose of their text. Furthermore, the pupil identified an image to support understanding of the experience of the speaker of the poem:

“...The poem is about the 9/11 terrorist attack and it speaks about a victim of the attack and how he is slowly dying in the tower. Due to the intensity of the fire he is contemplating whether he should jump or not, because he has no other option than to jump.”

Figure 14: Extract 2 from Pupil A’s Written Response Multimodal Assessment.

Combining the photo with the imagery from the poem creates a literal connection. Both the poem’s speaker and the subject in the picture are *small* compared to objects around them, and they both are near clouds. Yet, in their written work, the pupil also illustrates knowledge of figurative language:

“The line creates the image that the person looks small compared to the clouds and that the clouds are much larger than he is. It also creates the image that the person is in the clouds and that they are floating and from the ground that clouds make him look small; he may look big compared to a normal person but he looks small because the clouds are big.”

Figure 15: Extract 3 from Pupil A’s Written Response Multimodal Assessment.

Pupil A completes a comparison between linguistic and pictorial modes which enhance each other's meanings. Beyond the physical and literal comparison, the pupil reflects on the figurative emotion of *feeling small*. The written analysis is significant because it confirms the pupil's knowledge of imagery. Pupil A demonstrates a secure grasp on developing a personal metaphorical meaning which is also supported in the written analysis. Commonality is found and highlights modal affordances.

The pupil uses arrows to annotate and connect analysis to the photos and poetic lines, mimicking the learning and teaching resources. The arrows appear to follow an order to support the reader of the text. The layout design choice suggests the photo is central to the pupil's understanding and meaning-making of the poem's imagery.

Pupil A's multimodal text allows for the assessment of making sense of resources used throughout the poetry unit. This analysis exhibits an ability to apply a broad range of skills to decode and understand texts, as well as pupil's knowledge of modal affordances.

PUPIL B

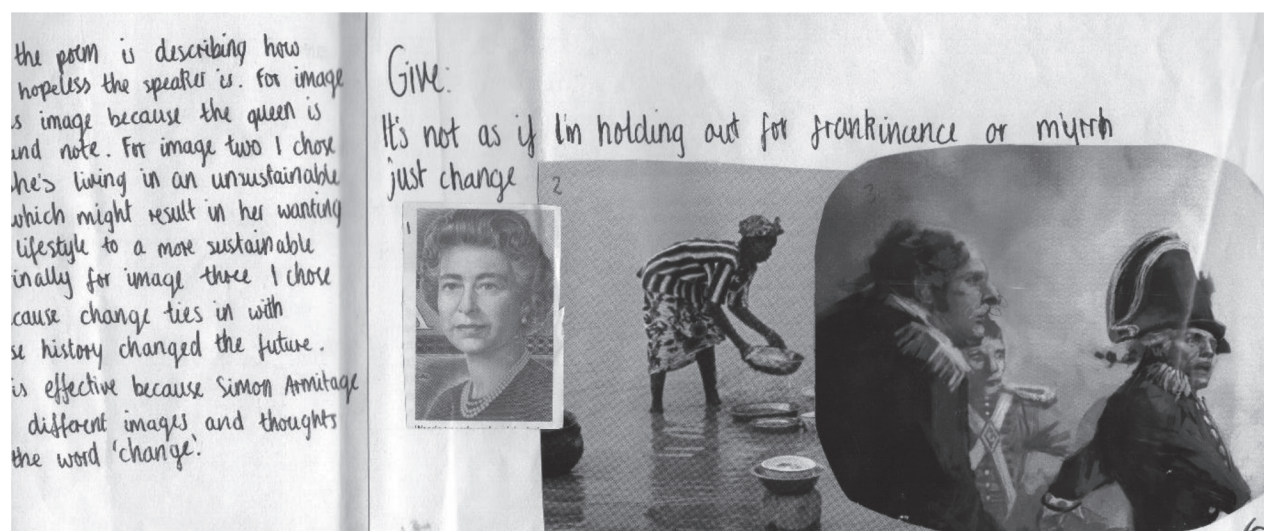


Figure 16: Pupil B's Visual Response Multimodal Assessment.

Pupil B sequenced multiple images to support exploration of the poetic lines "It's not as if I'm holding out/ for frankincense or myrrh, just change." (Armitage, 1995). Concepts such as wealth, poverty, and power are common threads explored by the student.

Numbering and laying the images out sequentially links directly to the written analysis. In the writing, the design choices and purposes become clear: Each photo represents a connotation of the word *change*. Through the symbolic use of the images, the student demonstrates the various ways to understand and make sense of the complexities of the poetry.

“Simon Armitage uses imagery effectively in the poem ‘Give’.
This line in the poem is describing how desperate and hopeless the speaker is. For image one, I chose this image because the queen is on a fifty-pound note. For image two, I chose this because she’s living in an unsustainable environment which might result in her wanting to change her lifestyle to a more sustainable surrounding. Finally for image three I chose this image because history changed the future. The imagery is effective because Simon Armitage creates any different images and thoughts based off of the word ‘change’.”

Figure 17: Extract from Pupil B’s Written Response Multimodal Assessment.

By commenting on the images and the connections to the poetry, Pupil B’s deconstruction of available designs is demonstrated. If the photos were omitted, readers may lose insight into how the student makes sense of the imagery.

The analysis of imagery is enhanced using multiple modes. Since the first image is connected to monetary value, we can assess that the student is grasping the literal meaning of the word *change*. However, the other images support the student in conveying their understanding of figurative language. The second image is significant because the pupil uses it to consider perspective and life experiences, *change* is figuratively understood as the process of improvement of well-being. In the final image, *change* is complex as it connects to the temporal aspects of human existence and history.

In *doing*, Pupil B learns to communicate meanings across available modes. This leads to multiliteracies development as the student utilises multimodal tools to create meaning for *change* based on prior knowledge and understanding of the learning and teaching materials.

PUPIL C



Figure 18: Pupil C’s Layout Multimodal Assessment Text.

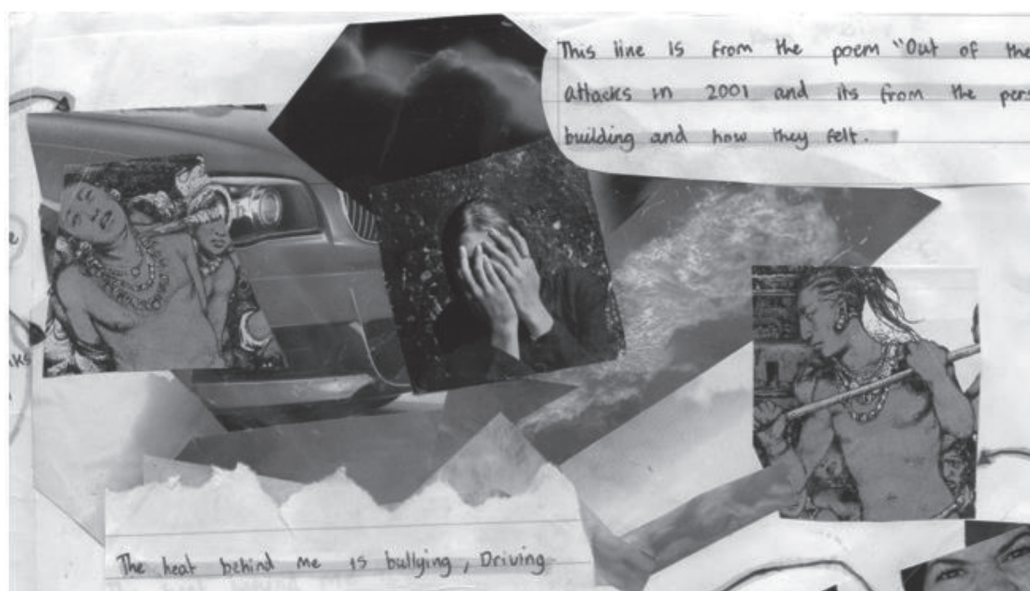


Figure 19: Pupil C's Visual Response and Chosen Poem Line Multimodal Assessment.

In the pink highlighted section of their text, Pupil C explores, “The heat behind me is bullying driving” (Armitage, 2008). The layout is complex and includes a range of colours and images, and the annotations are specific, in-depth, and mimic the exemplars provided in class. Pupil C demonstrates a strong grasp of modal affordances in their text design. Three different colours, one for each poem, highlight connections and act as organisational support to guide readers through their work. This suggests critical considerations of audience.

Pupil C manipulates and layers images to create meaning. Beyond providing large paragraphs of information about the context of the poem and the justification for these choices, symbols and arrows connect smaller annotations to specific ideas about the visual aspects of this design. This reflects a sophisticated understanding of imagery and modal affordances.

Each visual aspect serves a specific purpose which is explained in the annotations. Like Pupil A, Pupil C uses arrows to annotate, suggesting that the learning and teaching methods and materials are influential. The annotations mention symbolism, metaphor, personification, and tone, demonstrating how Pupil C is linking ‘mere’ literacy and multimodality.

“The car is here for the metaphor of “driving”.”

“The images of fire represent the heat and it growing.”

“This person here is the one being threatened/bullied it link to the person bullying [seen on the other side of the collage]”.

Figure 20: Extract 1 from Pupil C's Written Response Multimodal Assessment.

"The imagery is effective here because the personification in this line emphasises how bad the fire is and how its driving him to death."

"I chose this image here as it looks like someone (the person in this image) looks like they are threatening someone, so it links to the personified "bullying"."

Figure 21: Extract 2 from Pupil C's Written Response Multimodal Assessment.

"The image that this line creates is the fire growing behind him and it's getting too hot. The heat is personified here with the "bullying, driving". It makes us think how the heat is making him feel and how much pain he's in. The line also emphasis how the fire is growing rapidly and her needs help."

Figure 22: Extract 3 from Pupil C's Written Response Multimodal Assessment.

Literacy across several modes, including gestures captured in the images, is demonstrated. The written work demonstrates a solid understanding of poetic techniques and an awareness of the audience.

Although Pupil C engages well in English and has many strengths in the subject, the depth of their response highlights the significant benefits of a multimodal approach to assessment for all students, regardless of their strengths and learning barriers.

PUPIL D

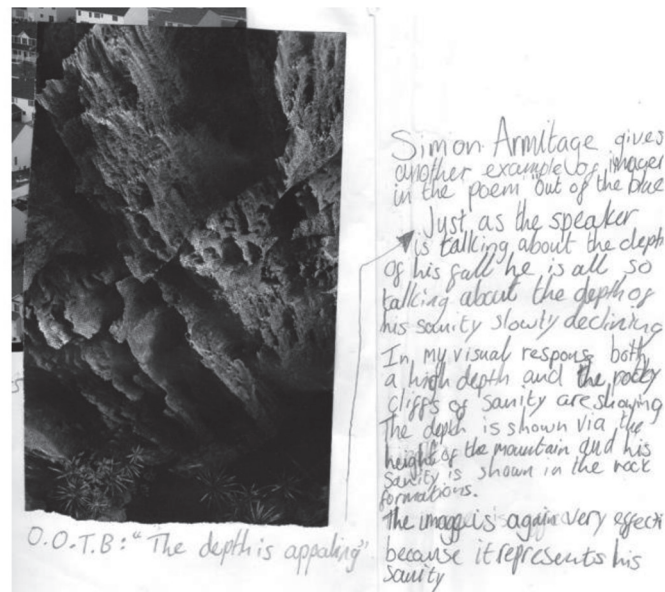


Figure 23: Pupil D's Image, Poem Line, Layout of their Multimodal Assessment Text.

Pupil D's text focuses on the analysis of the line "The depth is appalling" (Armitage, 2008). When assessing the image, the focus appears to be on the height of the cliff, its connection to *depth* in the imagery, and the emotional response to the danger of falling. However, the writing suggests the image prompted consideration of the texture of the cliffside and the contrast of the shadows. The metaphorical outlook becomes clear as Pupil D comments on the significance of the anxious atmosphere in the photo and poem's imagery:

"Just as the speaker is talking about the depth of his fall he is all so talking about the depth of his sanity slowly declining. In my visual response both a high depth and the rocky cliffs of sanity are showing. The depth is shown via the height of the mountain and his sanity [the speaker] is shown in the rock formations."

Figure 24: Extract from Pupil D's Written Response Multimodal Assessment.

Pupil D notes the image's connection to the mental state of the poem's speaker. Identifying the cliff as a symbol of the sanity of the speaker illustrates the pupil understands perspective. This justification also illustrates knowledge of figurative language. Assessing the use of modes to produce this text offers some evidence that the image supported understanding of imagery when Pupil D concludes, "the image is again very effective because it represents his sanity." The affordances of the image, the poetry, and the student's written analysis connect the rock formation to the experience of the speaker and the unsettling tone the imagery creates.

The layout is straightforward. One image is selected but several aspects of the image are identified to support this analysis. Because the imagery from the poem acts as a caption for the picture of the cliff, we may conclude that the picture itself is central to the understanding of imagery. The use of arrows connecting the image, imagery, and written response suggests an influence of the teaching and learning resources on the layout.

In a traditional literacy assessment, Pupil D's written response may not be efficient. However, through the lens of a Pedagogy of Multiliteracies, assessing how the re-design led to the creation of a visual metaphor and assessing how the written response justifies the decisions, our understanding of these skills is greatly improved. This response to the multimodal assessment thus raises questions of inclusivity within the classroom and how multimodality combats it.

Conclusion

Pupils' final text productions make clear that access to and use of visual, spatial, and linguistic modes supported their meaning making and understanding of imagery. Pupils demonstrated multiliteracy skills when working across modes, suggesting that a Pedagogy of Multiliteracies and a multimodal approach to assessment allows the learners to practice more than 'mere literacy'.

A lack of general success criteria to support practitioners' assessment of pupils' multimodal designs and multiliteracy skills remains a key issue. However, assessing pupils' abilities may be less complicated than expected, as suggested by Figure 8.

We are left to contemplate: How do educators appropriately respond to the ways pupils use various sign systems and modes throughout units of work when creating assessment opportunities? Adopting a Pedagogy of Multiliteracies and multimodality can aid practitioners in answering this, and other questions involving issues of inclusion and assessment.

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The ‘Clogs in The Wheel’ of Development of school Administration in Nigeria

Victor Olugbenga AYOKO

Abstract

This paper discussed the ‘clogs in the wheel’ of progress faced by school administration and development at all levels of education in both private and public schools in Nigeria. The interpretive research approach was used by holistically and historically employing Secondary data from prints and online sources to support the points mentioned in the paper. The challenges working against the smooth development and administration of schools in Nigeria are much. Some of which include problem of special needs and inclusive education, inadequate local and foreign collaboration, lack of proper autonomy, natural and man-made disaster, poor public library services and bad reading culture among others. The study identified that these problems are not peculiar to Nigeria alone but most developed and developing countries face similar challenges. The finding from this research is that these problems are jointly caused by all stakeholders contrary to the general belief that they are caused by bad governance. To solve these problems, the paper suggested: Policymakers should make Nigerian education marketable to attract foreign revenue, brain gain, global competence, improved ranking, and collaborations by improving the standard of the Nigerian educational system in line with global best practices and expectations, to deter fake results, academic institutions and employers of labor should scrutinize security symbols and seals of academic institutions, Our libraries should be up to date and upgraded to electronic and digital open versions for easy access to information, Examination regulatory agencies and school administrators must synergies to curb examination malpractice in our school system

Key Words: Administration, Clog in the Wheel, Education, Development, School

Introduction

The challenges faced by the education sectors in Nigeria have made Nigerian education less marketable in the globally market. These challenges have placed Nigeria in a bad position and ranking in line with global standard. Though, these problems are not peculiar to Nigeria alone, but to other developing and developed countries.

As opined by Agobue & Anyaeji (2021), for a man to meet up with the process of social life especially in this knowledge economy, education is a vital prerequisite.

“To compete globally, the education of the citizen starting from the primary school level to the tertiary level must be the priority of any government. Education is a major criterion used to evaluate the growth and development of any nation because the easiest way to destroy a nation is to kill the education sector”

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The Nigerian Education sector is facing challenges that emanate from the digital transformation in technological advancement, knowledge economy, globalization and internationalization complex cultural and religious issues, man-made and natural disaster, and political practises

The retardation trend in the education sector caused from poor budgetary allocation to education in past 10 years had forced Nigerian lecturers to seek for greener pasture in developed countries while Nigerian students also seek quality education outside the country due to poor governance and bad public image of the poorly ranked education in Nigeria. This paper looked into these challenges, the causes and made suggestions on the way forward.

Research Methodology

This review of literature looks at issues holistically and historically in line with interpretive research paradigm. Data collected from secondary sources from online journals and print media were arranged into themes, and analyzed for relevant contents especially on issues militating against the progress of education sector in Nigeria.

Concept of Challenges

The corner stone for a viable economic growth and development in Nigeria and other developing countries is quality Education.

Administration is a process of developing resources to achieve set goals and objectives in an organization. The problems militating against the, administration, and development of education in Nigeria are multiple-faceted and overwhelming.

A challenge can be simply defined as an unfavorable condition or situation that required urgent call for action. Challenges vary in scope and complexity ranging from simple to complex one (Ronald, 2018).

It is therefore important to understanding the structure of the challenging situation by identifying the simplicity or complexity to enable people to be able to channel a way forward in order to overcome the challenges

The problem is the challenging issue or unfavorable situation; The process is the methodology, steps or procedure that will be employed to solve the problem or complete the task; The product is the solution, recommendations, suggestions or way forward in solving the problem; The criteria are the yardsticks, guidelines, benchmarks, and standards for assessing the success or failure of educational interventions or programmes

Challenges of Effective Administration of Schools

(1) Inadequate Local and Foreign Academic Collaborations

Academic collaboration is a formal relationship of an academic nature entered into for academic excellence and development. Such areas of expected collaborations include joint research especially comparative research, joint degree programs, joint institutes or centers, and so on. Collaborations can be locally between two faculty members, between two institutions, and internationally between institutions from different

countries. This leads to a cross breed of ideas and leveraging on the resources of parties involved. Presently, the level of collaborations among educational institutions within and without Nigeria is nothing to write home about due to the associated problems.

The problems associated with this wonderful and developmental concept are personality clash, unhealthy competition, lack of information and experience, lack of technological know-how, resistance to change, cultural mismatch, and administrative bottleneck between collaborating institutions.

(2) Lack of Proper Autonomy in Higher Institutions

Akinwumi & Olaniyan (2001) defined university autonomy as the “freedom to teach and examine students undisturbed, freedom on what to teach and how to teach it, freedom of research and freedom to select students”.

The results of truncating the university’s autonomy are serious. These include: poor academic outcomes and weak teaching strength. The impact of political interference on academics can be overbearing and can tell on the long-term development of an academic institution. “The implication of university education politicization has contributed to the falling standard of university education, poor management, poor international rating, under-development, corruptions and strike actions”.

(3) Natural and Man-Made Disasters

According to Blessing (2014), one of the most pressing challenges facing the provision of quality education in Nigeria is climate change with its associated hazards. Offorma (2010) defined climate change as a continuous, rapid, and prolonged alteration of climate in one direction which reflects changes in the variability or average state of the atmosphere over time scales, ranging from decades to millions of years.

The findings of a study carried out by Blessing, (2014) revealed several implications for quality education in the Nigerian educational system. The study highlights the issue of lateness, absenteeism, school drop-out, destruction of school buildings and learning materials, incompleteness of curriculum content as well as the closure of schools due to climate change-related problems. She opined that all of these could increase the illiteracy level of the country and consequently jeopardize the government’s efforts toward meeting Millennium Development Goals.

A pandemic according to Ayoko (2022) “is an epidemic of an infectious disease that had spread across a large region like a state, country, continent, multiple continents or world-wide. When a disease spread is exponential, it becomes a threat to livelihood and the social and economic effects usually lead to students dropping out of school. The recent covid-19 pandemic contributed to an increase in the rate of school dropout especially in the third-world countries. This is due to the lockdown protocol adopted as safety strategy, schools, social and business activities were put on hold for months and this adversely affected the socio-economic condition of the masses. The financial pressure due to the lockdown aggravated the rate of school dropout. The effects of any form of pandemic results into circumstances that are beyond the school, students and even the government and this may lead to dropout in school by vulnerable students”

(4) Problem of Special Needs and Inclusive Education

Inclusive education is based on the principle that all children should learn together, regardless of disability, socio-economic background, cultural, religious or age difference. As penned by Obi (2007), there seem to

be a great discrepancy between theory and practice in the provision of educational services to children with special needs in Nigeria. Most of the children with disabilities in schools are there courtesy of Charitable Organizations and individuals. The challenges facing the implementing of inclusive education in Nigeria are due to our orientation and disposition towards special needs children. The myth surrounding the birth of a special needs child sometimes causes negative attitudes from parents and pupils that are not disabled.

(5) Poor Public Library Services and Bad Reading Culture

Kiyosoki (1997), the author of 'Rich Dad, Poor Dad,' once said that "If you want your intelligence to grow, go to a library, a bookshop or a school". He further opined that, "to be effectively competing as part of the global economy, we must become an intelligent society and to become that, we must be a people that read". Ambrose (2014) documented that a reading nation is an informed nation. But Nigeria cannot be regarded as a reading nation because the younger generation of Nigerians does not consider reading a leisure activity. The poor reading habits of these younger Nigerians affect their performances at school and during examinations. It has been proved that children/students with poor reading habits do engage in anti-social behaviors such as school violence, bullying, and examination malpractice.

(6) School Dropout and Out-of-School Syndrome

The rate of school dropout especially after junior secondary education is becoming alarming in Nigeria. Nigerian out-of-school children figure has oscillated between 10.5 million and around 15 million for more than a decade, with the situation growing worse due to the degenerating security situation in the country. Out-of-school children are the children whom the government and the parents have failed to provide quality basic education for. The term "out-of school children" is a non-attendance of the school of school-age children for some established factors.

There are many factors responsible for out-of-school children in Nigeria. Some of the factors include; poor funding of education, corruption, poor implementation of Child Rights law, insecurity problems, Lack of political will to address the problems, high rate of poverty, and high fertility rate. The social implications of out-of-school children include security challenges, shortage of skilled manpower in future, bad international image, high levels of illiteracy and high socio-economic and dependency issues. (Ogunode, Adanna & Ayoko, 2023)

According to Jordan et al. (1994), school dropout can be linked to two different factors. These are adverse situations within the school environment and factors within the individual student. However, Watt & Roessingh (1994) introduced a third reason known as 'falling out of school'. This happens in a condition that the concerned student does not show improvement or progress in school work and eventually becomes apathetic or even disillusioned with school completion. This is usually a 'side effect' of insufficient personal and educational supports from parent, society and government.

(7) Low University Admission Capacity and Accessibility Problem

The demands for higher education have become very high and competitive because of the benefits and socio-economic gains. Akubuilu & Okorie (2013) argued that while an increase in the number of educational institutions may address the issue of access but other factors such as shortage of teaching staff, research grants, infrastructure, corruption, quality, and weak technology are even more serious challenges. Agboola

& Ofoegbu (2010) noted that access to university education in Nigeria when compared with the number of qualified applicants is low, as a result, the gap between successful or qualified candidates and those admitted has continued to widen every year.

(8) Poor Parenting / Guidance

Poor parenting has resulted in a high level of immoral behavior among students and this posed a serious challenge to the school and society as a whole. Afuye (2015), reported the forms of moral decadence as; cultism, Rape, examination malpractice, Teenage pregnancy, student prostitution, sexual harassment, sale of “Grade” students’ demonstrations, drug abuse, indecent dressing, and so on.

(9) Drugs and Substance Abuse

According to Dankano & Garba (2017), the substance abuse problem in Nigeria is not different from other countries though there may be variations in the magnitude of the problem. Similarly, students and youth found in the acts of drug abuse are often academically and socially less developed as they are not respected and recognized to make a reasonable contribution to any development. This is because drug abuse does not only downgrade the academic performance of students but also affects the moral, physical and general buildup of the students (Kandel & Chen, 1995). Morally, students are otherwise disobedient to their teachers, parents, and their senior students both at school and home as a result of drug influence.

(10) Examination Malpractices

Citing Onyibe et al. (2015) the Examination Malpractice Act (1999) explains examination malpractice as any act of omission or commission by a person who in anticipation of, before, during, or after any examination fraudulently secures any unfair advantage for himself or any other person in such a manner that contravenes the rules and regulations to the extent of undermining the validity, reliability, authenticity of the examination and ultimately the integrity of the certificates issued. The rate and manner it is perpetrated nowadays call for serious concern. The rate of this crime has become so widespread that there is virtually no examination anywhere at all levels and outside the formal school system that there is no one form of illegal practice or another, (Ojonemi et al., 2013).

(11) Cultism

Cultism can be defined as a ritual practice by a group of people whose membership, admission, policy, and initiation formalities as well as their mode of operations are done in secret and kept secret with their activities having negative effects on both members and non-members alike (Ajayi, 2015). The adverse effects of cultism in educational institutions especially in secondary schools level have continued to be a source of worry to governments. The menace and aggressiveness of cult members and cult-related activities is the most embarrassing problem facing tertiary institutions as this has resulted in escalated crime rates in the various institutions of learning today.

(12) Poor Ranking of Nigerian University

Ati (2017) attributes poor ranking to low visibility on the web and the inactivity of scholars and researchers to contribute meaningfully to the world of knowledge. In most cases, the institutional framework for effective activity is deficient and most research information does not go beyond the four walls of the institution. Low

(webo-metrics) ranking could lead to a lowering of the esteem of the staff in the eyes of stakeholders, especially potential students and funding authorities. Maybe only a handful of parents would whole-heartedly send their children to institutions with low rank (Anyira & Idubor, 2020)

(13) Offering of Unaccredited Courses

Some Nigerian private and public universities are poorly resourced. This explains the rising number of academic programs that are losing accreditation. Parents and concerned authorities who desire graduates with an acceptable level of competency in their areas of specialization are very worried about this development. (Eno-Abasi & Atueyi, 2016)

Admission of students into courses and academic programs that are not accredited by the Nigerian university commission is among many admission scams that have been reported in Nigeria. One of the major risks of pursuing an unaccredited degree is that it affects the chances of employment opportunities because many employers will not hire a potential job candidate if the degree they hold was granted by a learning institution that is not recognized. Unaccredited institutions usually do not have the same educational standards and policies as accredited institutions and employers are likely to want to feel confident by hiring someone with an accredited degree from an institution that is recognized.

(14) Admission Racketing

Admission racketeering can be defined as an illegal process that comes up when admission seekers pay money to a certain set of people to gain admission into any level of education. It is a “money-for-admission” process in the school system. This process is now rampant in our tertiary institutions, secondary schools, and even in some primary schools. The government, parents, lecturers, school administrators, and students are all major causative factors in this disgraceful act. This act has not only degraded our education system but, it has also affected the Nigerian economy and national development at large.

(15) Problem of Internalization of Nigerian Education

Internationalization is a process of change that is tailored to meet the individual needs, the interests of each higher education entity, and the development of the country as a whole.

The advantage of education internationalization includes improved academic quality, internationally exposed students and staff, academic collaborations, and national and international citizenship for students and staff from underdeveloped countries. Revenue generation and brain gain are potential benefits for developed countries. Higher education internationalization has been described as the process by which higher education institutions compete for students globally as well as the processes by which they attempt to prepare students for a globalized world. Nigerian higher institutions especially universities are struggling with an international outlook.

“The Nigerian higher education lacks policies that spelt out how foreign lecturers will be attracted to work in their various institutions. There is no specific policy to encourage international students and lecturers to come and study / work in the country. Many countries like South Africa, Malaysia, UK, USA, India etc have policies to attract international students and lecturers. The lack of this internationalization policy is another reason for low employment of foreign lecturers in the Nigerian higher institutions especially the universities”. (Ogunode, Ayoko & Okechukwu, 2022)

(16) Inadequate Scholarship / Bursary for local and Foreign Studies

Inadequacy of federal and state government scholarship and bursary award schemes is a major problem affecting educational funding in Nigeria. There is a gross lack of transparency in the administration and award of these scholarships and bursaries in most states of the federation. Often time, the awards are not done on merits but mam-know-man. Brilliant but indigent students are denied these opportunities instead such opportunities are given to children of rich men, politicians, and cronies.

(17) Unwillingness to Study Education as a Course

Teacher training institutions are bedeviled by low-quality candidates because most students do not want to study Education as a course but decided to do so reluctantly due to a lack of interest and motivation to become a teacher. This results in poor quality education graduates. Teacher education is seen as the last option when students fail to secure admission into their course of choice. This leads to a lack of commitments, poor performances, and eventually poor quality graduates.

Conclusion and Findings

The problems facing school administration in Nigeria have become a ‘clog in the wheel’ of development in the education sector at all levels. These challenges if not quickly looked into will reduce the marketability of Nigerian education in the global domain because products of such education may not be able to meet up with the globally acceptability. There is need for behavioral modifications in tandem with the global best practices through Mass orientation of the citizens.

Effective leadership style is paramount to the realization of the goals and objectives of the school system as enshrined in the national policy on education. Unfortunately, both the internal and external administration of schools at all levels is infected with various problems. These hydra-headed problems are artificial and can be curbed through a reorientation, public-private partnership, dialogue, collaborative policy formulations and implementation, mutual community development services, innovative research, reformations, war against indiscipline and transformations.

Real transformation in the quality and standard of education delivery will be possible when an experienced, selfless and visionary person that understands the importance of investment in education becomes the leader. As decision-makers, policymakers, and stakeholders, the ball is in our court.

Suggestions

The followings are suggested based on the varied challenges militating against the effective school administration and developments in Nigeria

- (1) Examination regulatory agencies and school administrators must synergies to curb examination malpractice in our school system
- (2) Policymakers should make Nigerian education marketable to attract foreign revenue, brain gain, global competence, improved ranking, and collaborations by improving the standard of the Nigerian educational system in line with global best practices and expectations

(3) To deter fake results, academic institutions and employers of labor should scrutinize security symbols and seals of academic institutions. They should also contact issuing schools to verify the authenticity of certificates presented to them. The Electronic Transcript Exchange (ETX-NG) and certificate verification system for Nigeria may be useful in this regard.

(4) Our libraries should be up to date and upgraded to electronic and digital open versions for easy access to information. In addition, the government should encourage local writers and publishers by making available special funds or subsidies so that local content can be included and promoted and adequate ICT infrastructure (hardware, software, internet connectivity, and alternative power source) should be made available by management for effective utilization of web services by staff. This can be achieved through Formulation and implementation of a good web Policy, Improving the Institution's Web Visibility, Increasing the Size of the web content, Uploading documents in rich Files Formats, and Improving Scholarly research

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Business Education Software Applications for Instructional Delivery among Business Education Lecturers in Universities

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Abstract

The paper reviews business education software applications for instructional delivery among business education lecturers in universities in Nigeria. The paper considers the three software applications of the three areas/options of business education which include; accounting, marketing and office technology management software applications. The findings of the review indicated that accounting, marketing and office technology management software applications can be utilized for business education instructional delivery with the aim of inculcating the competencies of these software applications to students who are prospective employees in the business world. It was also found that there is an existing gap between current business practice and business education instructional delivery. The paper concluded that there is need to determine the present training needs of business education lecturers in the usage of accounting software applications, marketing software applications and office technology management software applications in order to have an effective and efficient utilization of these applications for instructional delivery as well as bridge the existing gaps between current business practice and business education instructions.

Key Words: Software Application, Instructional Delivery, Business Education Lecturers

Introduction

Business education was seen as one of the educational training programmes which comprises of knowledge, skills, abilities, competencies, capabilities, structural activities as well as other structural experiences and competencies acquired formally through either on-the-job or off-the-job, which has the capability of improving recipients' opportunities of securing jobs in different sectors of the economy or enabling them to be self-reliant (Ekaette & Edet, 2016). Therefore, business education is the inculcation of relevant competencies needed by individuals to enable them not to only teach business concepts, beliefs, ideas, knowledge and skills but also be able to perform effectively and efficiently in the business world. There are three broad areas/options in business education which include accounting, marketing and office technology management as indicated in Figure 1.

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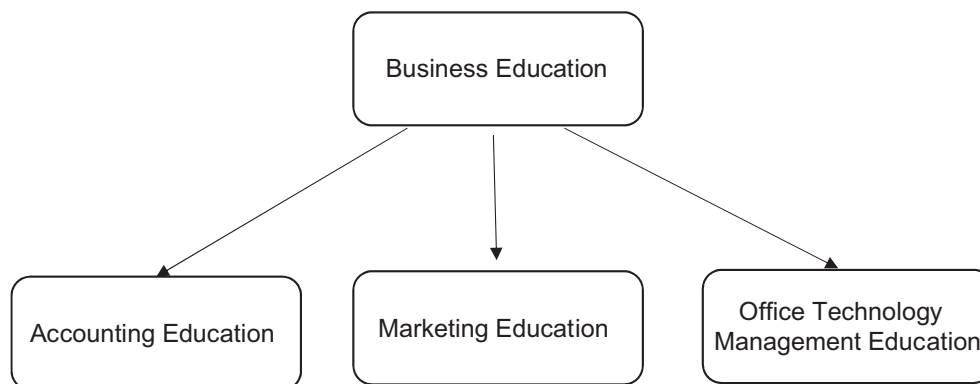


Figure 1: Broad Options/Areas of Business Education Programme

In spite of the paradigm shift in ICT and the complexity attached to globalization, business education lecturers need adequate and effective training and development in order to meet the demands of the present society (Adanne & Adizi, 2018). The emergence of modern technologies such as computers and its software applications has become an indispensable tool for business education's instructional delivery and therefore the need for training business educators in this respect is inevitable (Okanazu et al., 2017). This assertion is in line with the recommendation of Ugwoke et al., (2018) encouraging the need for the teaching of computers in business education with the view to equipping the business education students with the necessary ICT skills upon graduation.

As a competency based educational programme, business education relies on modern technologies to some extent (Chukwuemeka & Igbenedion, 2017). That is why Ajunwo (2017) recommends that government and other partners in education should provide the necessary ICT facilities in both hardware and software with the view to encourage their utilization in business education's instructional delivery. Despite the fact that Ajunwo (2017) asserted that utilization of computer software applications in instructional delivery has contributed significantly in simplifying and executing teaching and learning processes, business education lecturers have not utilized accounting, marketing and office technology management software applications for instructional delivery.

Despite government commitment in the production of a reliable business education graduate, there are various criticisms that current business education graduates in Nigeria are incompetent in the usage of modern technologies (Nwokocha, 2015). The authors further stressed that presently, business education lecturers were faced with the challenge of integrating and utilizing ICT facilities for instructional delivery in such a way that enhanced their students' academic performance (Nwokocha, 2015). This challenge can be overcome through training them for effective service delivery. Even though there is a paradigm shift in business education's instructional delivery in tertiary institutions with regards to the application of emerging technologies (Okanazu et al., 2017), but there are various issues hindering the smooth utilization of the emerging technologies among business educators as opined by Okanazu et al. (2017) stating that most of the business education lecturers in tertiary institutions of learning lack the needed competencies necessary in meeting up with the emerging technology for instructional delivery. Hence the need for ascertaining the required competencies of utilizing software applications for instructional delivery among business education lecturers becomes imperative as concurred by Agbo (2018) who stated that business education lecturers are highly instrumental to the integration of ICT driven education in Nigeria.

Similarly, in conformity with the assertion of Otonko (2012) who concluded that one of the contributions of university education in Nigeria is facilitating the effective industrialization of the economy through the provision of competent human resources with adequate managerial, technical and professional skills. This contribution can only be sustained through training and retraining of university lecturers most especially business education lecturers who are the drivers in the provision of effective man power that will manage the economy. Based on this background, this paper reviews accounting, marketing and office technology management software applications for business education lecturers' instructional delivery in Nigerian universities.

Accounting Software Applications for Business Education Lecturers' Instructional Delivery

Accounting refers to the systematic process of identifying, recording and communicating all economic events of an organization (business or nonbusiness) to interested users of the information (Weygandt et al., 1998). In his contribution, Ahmed (2014) states that accounting was defined by The Committee on Terminology of the American Institute of Certified Public Accountants as "the art of recording, classifying and summarizing in a significant manner and in terms of money, transactions and events which are in part at least, of a financial character, and interpreting the results thereof". Also Eze (2014) asserts that accounting is a generic terminology that covers both bookkeeping and accounting aspects of an economic entity, it provides quantitative financial reports about an economic entity for both internal and external users in making decisions.

Accounting software applications are the various application software packages that record, organize and process accounting transactions with reference to the functional accounting modules such as accounts receivables, accounts payable, general ledger, journal, trial balance and payroll among others. These include: Peachtree, QuickBooks, Accounting Xpert, LedgerLite, Traverse, Receipt Bank, Mr Accounting, Invoice2go, Sage Business Cloud Accounting, Crunch Accounting, Oracle Financial Cloud, Close Management Software, Accounting by Wave, Clear Books, Busy Accounting Software, Cashflow Manager, Invoice Quickly, SlickPie, DAC Easy, PACIOLI 2000, SMACC, Cashbook Complete, Accounter, MS-Money Manager, Kashflow and many others as indicated in Figure 2 (Nazif, et al., 2016; Onyeka, 2006).



Figure 2: Examples of Accounting Software Applications

Source: Basnayaka (2016).

Emerging trends in the current business environment have caused a paradigm shift in the roles of financial accountants from traditional function of users of information to additional roles of evaluators, designers and managers of information systems (Tudor et al., 2013). This is because of the rapid change necessitated by the emergence of ICT. As technology continuously changes the businesses that are conducted, the incorporation of ICT in the teaching and learning of financial accounting remains sacrosanct as accounting future graduates will be required to provide various services that are based on software applications in the world of work (Tudor et al., 2013). In the same vein, the use of software applications remains one of the modern ways of financial accounting instruction in recent time thereby facilitating the attainment of various goals of teaching and learning (Dimitrios et al., 2013). Previous literature has affirmed that by utilizing accounting software applications in instructional delivery an emerging and promising learning environment is created which offers an alternative means in teaching and learning of accounting courses (Nazif et al., 2016; Dimitrios et al., 2013). But the sole or excessive use of software applications in teaching financial accounting can be detrimental to the students' in-depth understanding of the fundamentals of accounting most especially to students that lack sound theoretical background of the subject (Dimitrios et al., 2013). This clearly indicates that software applications should be used to supplement the present conventional teaching strategies with the view to bridge the gaps between theory and practice in the world of work.

In the same vein, empirical evidence has proved that utilization of accounting software applications in instructional delivery among lecturers has a positive impact on students' performance (Osuola & Adukwu, 2013; Nazif, et al., 2016). They therefore stressed the need for business education lecturers most especially those teaching financial accounting to possess the required competencies necessary for effective utilization of software applications in teaching of financial accounting. However, Connell et al. (2011) argued that even though using accounting software in instructional delivery might improve the students' academic score but its over reliance might potentially block the students' learning outcome in grasping and understanding basic accounting concepts and procedures. This challenge can be ameliorated by balancing in the usage of the software by the lecturers in instructional delivery as suggested by Nazif et al. (2016).

Marketing Software Applications for Business Education Lecturers' Instructional Delivery

Marketing is a process aimed at determining what products or services will interest a customer (Assad & Gomez, 2011). In the words of Kotler (2003) marketing "is the art of creating genuine customer value and the art of helping your customers to become better off". Marketing is a managerial and social process by which individuals and organizations obtain what they want and need through creating and exchanging value with others (Kotler & Armstrong, 2013). However, the impact of ICTs on the marketing sector has revolutionized the way marketers analyze, measure and respond to marketing activities (Echegaray & Gacia-Martin, 2019). This is in line with the assertion of Gonzalez-Fuentes (2016) who asserts that as a result of a paradigm shift in ICT in the past two decades, marketers were prompted to a change in marketing focus, strategy and competencies. The author further stressed that there is need for new marketing competencies as a result of the rise in "tradigital marketing" whereby marketers were provided with opportunities to utilize social media, internet of things, data mining and artificial intelligence in order for their businesses to meet up with the challenges of the 21st century.

The advent of the internet has brought about a paradigm shift in marketing not only changing the nature of a business and its market, but also transforming the way they relate to each other (Haig, 2001).

Similarly, marketing through the use of software applications remained the fastest growing type of direct marketing as a result of excessive use of the internet technology whereby marketers and buyers can easily come into contact (Armstrong & Kotler, 2011), this new technological breakthrough has dramatically changed marketing strategies and practices to meet the present needs of today's world. Today, there is a proliferation of marketing activities online, a lot of companies deal with their customers via their various websites with the use of marketing software applications, hence the need for business education students to be conversant with the usage of marketing software applications since they are the future marketers. This prompted the need for constant identification of a blend of competencies that will develop marketing graduates into competent marketing professionals (Walker et al., 2009). In the same vein, universities and other educational institutions are under constant pressure from their students and employers of labor to equip graduates with the relevant skills and capabilities required for the present world of work (McCulloch, 2008).

Marketing software applications are the various software packages that assist business organizations successfully execute sales promotion campaigns, reach their target customers or markets and successfully convert leads into sales. These include: Marketo, Hub Spot, Sailthru, Vocus, Yesware, Optimove, Infusionsoft, Demandbase, LocalVox, WordStream, Trello, Salesforce, Campaigner, Campaign Monitor, Mandrill, Autopilot, Pardot, Google Ads, Asana, Bing Ads, Taboola, Domo, Cvent, Event Farm, Clear Voice, Contently and many others (Vroutas, 2020). The most widely used marketing software is *Marketo* which is designed to assist business organizations in assessing and automating their marketing tasks through working with various digital channels which include; mobile devices, websites, email and search advertisements (Tech Target, 2018). One of the software's important features is its ability in tracking email links to assist a user to gauge the levels of engagement and the user can add the Branded Tracking Link(s) in order for spam filters to see the consistency between the links and user domain (Hill, 2012).

Similarly, with *Marketo* software a lot of features are in place which include; lead nurturing, lead scoring, campaign analysis, digital advertisement, website personalization, CRM integration and social marketing (Tech Target, 2018). Figure 3 indicates the sample menu for leads scoring in *Marketo*. The software also records the behavior of customers such as; customers' usage of the site, the time spent on the site, what was viewed on the site, and the time and date the customer visited the site (Tech Target, 2018). Using *Marketo* software applications for instructional delivery by business education lecturers can go a long way in bridging the existing gaps between current marketing practices and present instructional delivery in business education programmes in Nigerian universities.

However, Royle and Laing (2013) reiterated the need for collaboration between educational institutions and the industries. In the same vein, Echegaray & Gacia-Martin (2019) have indicated that lack of correspondence between marketing curriculum and present marketing requirements is a matter of serious concern. This means that the present marketing students' competencies did not correspond to the prevailing marketing practices. Therefore, the need to keep the students abreast with the new marketing competencies required by the present business environment remains imperative. In achieving that, there is need for training business education lecturers on some of the marketing software applications with the view to making them up-to-date in imparting the needed competencies to their students

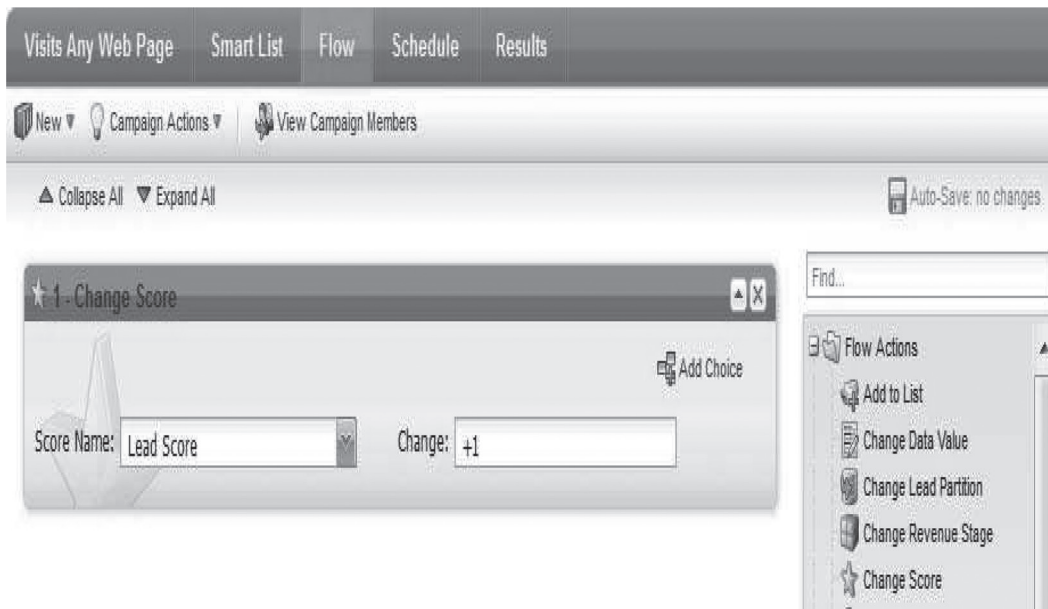


Figure 3: A Sample of Marketo's Lead Scoring Menu

Source: Marketo (2012).

Office Technology Management Software Applications for Business Education Lecturers' Instructional Delivery

Office technology management (OTM) refers to a branch of business education that prepares students to engage into teaching and office occupations as well as become capable and intelligent members of the present modern office (Ukata, 2019). The OTM programme was designed to provide graduates who are well equipped with relevant office and secretarial competencies necessary for effectively managing today's electronic-driven office. However, provision of modern office technologies to business education lecturers particularly those who specialized in OTM remain sacrosanct (Chukwuemeka & Igbinedion, 2017). If this assertion is achieved, training the lecturers with the needed competencies for using these technologies becomes imperative. Also, when the business education graduates lack the basic competencies needed for utilizing modern office technologies, employment opportunities become dim and consequently leads to persistent mobility of business educators to other areas with less comparative advantage (Chukwuemeka & Igbinedion, 2017). Therefore, the need for equipping the prospective graduates (students) with the required knowledge and skills necessary for effective utilization of the modern office technologies is inevitable. In the same vein, Sani (2015) suggests that there is need for making office managers up-to-date on the present developments in office technology and therefore require relevant training in order to remain relevant in the world of work. This suggestion can best be achieved through training the lecturers on effective utilization of modern office technologies as recommended by various studies (Ukata, 2019; Chukwuemeka & Igbinedion, 2017). The modern office technologies include office technology management software applications.

Office technology management (OTM) software applications are the various software packages used in modern offices which aid recording and filing of documents, scheduling meetings, receiving guests and

many more. These include: Bitrix24, Dialpad, Robin, Slack, Envoy Visitors, Kisi, Zoom, Comfy, OpenKM Document and many others (Lang, 2018). However, these software applications and many others can be utilized by business education lecturers in teaching OTM courses with the view to bridging the gap between the current OTM graduates' competencies with regards to the modern office and the present office requirements. In achieving the above assertion, there is a need for training the lecturers in that respect. In order to have a successful training of the lecturers, there is need to ascertain their present competency level with regards to the utilization of OTM software applications for effective and efficient instructional delivery.

Conclusion and Recommendations

Based on the prevailing gaps existing between current business practice and the instructional delivery in educational institutions as reported by various studies, there is a need for bridging the gaps through training of business education lecturers on the effective and efficient utilization of accounting, marketing and office technology management software applications for instructional delivery. To achieve this, there is a need for ascertaining the present training needs of business education lecturers with regards to the usage of these software applications in order to have a successful training programme. This will in turn acquaint their students with the relevant knowledge and skills for effective and efficient utilization of accounting, marketing and office technology management software applications in their future endeavour thereby bridging the existing gaps between current business practice and business education instructional delivery.

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Self-care as a Predictor of Job Satisfaction amongst Educators

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Abstract

Teaching has been found to be among the most stressful occupations in terms of work-related stress. Given recent findings on a potential link between self-care and increased job satisfaction, exploring the benefits of self-care amongst educators is valuable. The purpose of our study was to examine if self-care is a predictor of job satisfaction for educators. Fifty-seven educators across the state of Nebraska participated in a survey in which they rated various indicators of self-care and job satisfaction. The results suggest self-care is a significant predictor of job satisfaction for educators in Nebraska. This indicates that the greater education system should place more emphasis on self-care, not only for current educators, but also for students enrolled in teacher education programs.

Key Words: Self-Care, Job Satisfaction, Educators, Turnover, Retention

Educators are trained professionals who work with students every day to support their success. Though educators have a vital role in child development, many teachers choose to leave the profession due to high levels of work-related stress and lack of job satisfaction. Thus, we were interested to see if teacher self-care could lead to improved job satisfaction.

Turnover in Education

Johnson et al. (2005) examined 26 different occupations in terms of psychological well-being, physical health and job satisfaction, and concluded teaching was the second most stressful occupation. Schmidt and Jones-Fosu (2019) characterized 93% of teachers are highly stressed when evaluating levels of burnout, stress, efficacy, and coping. Furthermore, impacts of teacher stress can be systemic impacting the students as well (Schmidt & Jones-Fosu). For example, Herman, Hickmon-Rosa, and Reinke (2018) had teachers rate their levels of stress, burnout, efficacy, and coping. The students in their classrooms were also administered the Woodcock Johnson Academic Achievement Test—Third Edition to measure math and reading scores. The results showed that the teachers in the high stress, high coping, and low coping classes were associated with the poorest student outcomes (Herman et al.). Finally, Ronfeldt, Loeb, and Wykoff (2013) found teacher turnover negatively impacted student achievement in the areas of mathematics and English language arts.

Boe, Cook, and Sunderland (2008) found 25% of teachers leaving the profession. Dupriez, Delvaux, & Lothaire (2016) found high exit rates in first-year teachers. This may be further evidence as stress as factor

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given that first year teachers have increased burdens of planning and getting acquainted to a new role. Could self-care and increased self-efficacy be the cure to this systemic problem? Betoret (2006) indicates educators with a high level of self-efficacy and resources for coping mechanisms experience lower levels of stress and burnout than their counterparts with low self-efficacy and little or no access to these resources. Teachers perceived confidence in classroom management, emotional exhaustion, engagement, and commitment to teaching can all influence teacher well-being, whereas self-efficacy may be a protective factor by minimizing job stress (Dicke, Stebner, Linninger, Kunter, & Leutner, 2018).

Thus, we would argue that to retain teachers an emphasis should be put on increased job satisfaction. And, in order to enhance job satisfaction, the key may be related to better self-care.

Job Satisfaction

Several factors centered on social support and perceived goal attainment positively impact job satisfaction and teacher longevity. Clemons and Lindner (2019) studied teacher longevity and success in the secondary agricultural education classroom and found that developing their program, attaining professional goals, managing their time as an advisor, and developing friendships with other advisors were highly related to their success and longevity as agricultural educators. Olsen and Huang (2019) found both teacher perceptions of principal support and teacher perceptions of teacher cooperation were very strongly and positively correlated with job satisfaction for all educators. Finally, Sass, Seal, and Martin (2011) showed teachers who perceived strong support from administration were more likely to think they could positively impact their students; thus, instilling teachers with higher levels of job satisfaction.

Sangganjanavanich and Balkin (2013) explored burnout and job satisfaction among counselor educators and found emotional exhaustion to be a significant predictor of burnout. Educators who scored higher in burnout also scored lower in job satisfaction (Sangganjanavanich & Balkin). **Selbst and Zultanky (nd) express self-care as a clear remedy for burnout and compassion fatigue. As educators, counselors, and other nurturers of the self-growth of others, we need to remember the importance of self-care.**

Self-Care

Acker (2018) found that self-care improves job satisfaction among social workers. Bloomquist, Wood, Friedmeyer-Trainor, and Kim (2015) found professional, emotional, and spiritual self-care predicted lower levels of burnout, while professional and emotional self-care predicted higher levels of satisfaction. Other researchers found having sufficient coping resources—including strong levels of self-care and social support—could help to mitigate the effects of work stress to positively influence physical and mental health (Yang, Ge, Hu, Chi, & Wang, 2009).

Examining five areas of self-care amongst practicing psychologists (i.e., professional support, professional development, life balance, cognitive awareness, daily balance) and their impact on life satisfaction, researchers showed self-care is an effective means of stress reduction when done on an ongoing basis (Rupert & Dorociak, 2019). Additionally, participants who partook in 12 hours of mindful activities such as yoga, self-management, aroma therapy, cognitive behavioral therapy, and acupuncture reported lower feelings of stress, anxiety, and depression as a result of the self-care they experienced (Tsang et al., 2015). Reiser and

McCarthy (2018) implemented a mindfulness intervention for teachers and participants reported lower levels of occupational stress, anxiety, and burnout. They also noted increases in the areas of mindfulness, self-compassion, focused attention, and working memory capacity, among others.

While self-care is valued in educational professions, it is not frequently prioritized or practiced (Bloomquist et al., 2015). Additionally, not all self-care has been found equal in protective impact against stress. Sanford and Frey (2018) cited the difference between *superficial care*, disregarding responsibilities in the name of attending to one's own mental health, and *whole-self-care*, using deeper reflection techniques to address triggers for longer-lasting effects. These researchers recommend employing coping strategies to handle stress and attack the trigger rather than reactively treating stress symptoms (Sanford and Frey, 2018).

In general, self-care allows people to nurture themselves and remain committed to making a positive difference in the midst of making sacrifices and contributing to their field (Cardinal & Thomas, 2016). The aim of the present research was to advance the understanding of the relationship between self-care and job satisfaction within the realm of education. We hypothesize higher levels of self-care will predict increased job satisfaction for educators.

Current Study

The current study aimed to examine if self-care is a predictor of job satisfaction for educators. Because careers in education have been linked to high levels of stress and burnout, we sought to better understand the relationship between self-care and job satisfaction. The research question was, "Is self-care a significant predictor of job satisfaction for teachers?"

Methods

Participants

Participants were recruited from schools across Nebraska. Through the recruitment efforts, 57 educators volunteered to participate in the study. Participants reported to be teachers of grades Kindergarten through Grade 12. The genders of participants were reported to be 81% females and 19% males. Ethnicities were identified as follows: 98% White and 2% Native Hawaiian/Pacific Islander/Asian. The participant's teaching experience varied and was reported as follows: 2% less than one year, 16% one to five years, 18% six to ten years, 19% 11 to 15 years, 5% 16 to 20 years, and 40% more than 20 years.

Instruments

Participants read and signed an informed consent which included the purpose of the study, procedures, an expected time that it would take to complete the survey, voluntary participation, and contact information of the researchers.

Self-care. An overall measure of self-care, adapted from the Academic Success Center, Oregon State University, was utilized for the first portion of the survey. The measure consists of 17 Likert-type items. Higher scores indicated higher levels of self-care.

Job Satisfaction. The second portion of the survey analyzed job satisfaction and was based upon a single question: Are you satisfied with your current job?

Procedures

After receiving IRB approval, participants were recruited by contacting schools' principals who then distributed the informed consent, self-care survey, and the job satisfaction survey to the school's employees. All surveys were converted to the online software program, Qualtrics. An email was then sent out to educators containing an introduction to the researchers, a statement that participation was voluntary and the Qualtrics link. In order to access the survey, participants first had to give consent. Upon giving consent, participants were directed to the surveys. After completing the surveys, the educators were thanked for their participation. Data were analyzed using SPSS via regression analysis to determine if self-care is a significant predictor of job satisfaction.

Results

A simple linear regression was conducted to see if self-care was a predictor of job satisfaction. The results revealed the following: There is a large positive relationship ($R = 0.539$) between job satisfaction and self-care. Self-care accounts for 29% of the variance in job satisfaction for these teachers ($R^2 = 0.29$). Self-care is a significant predictor of job satisfaction in teachers, $F(1, 56) = 22.5, p < .01$.

Discussion

The primary purpose of this study was to evaluate whether or not self-care was positively or negatively correlated with job satisfaction. Kaiser and the National Institution for Education Statistics (2011) indicated that 10% of teachers in public schools leave the profession after one year and an additional 12% leave after two years due to burnout. As teachers and psychologists, we believe it is imperative to find better ways to support teachers and other nurturing professions. Self-care has been seen as a protective factor for job satisfaction. Better job satisfaction can increase longevity in these professions.

Participants for this study included educators working in schools across Nebraska; following a letter of introduction explaining the study, self-care and job satisfaction surveys were distributed via email by principals to educators in their buildings. Once data were collected, SPSS was utilized for the analysis. Results from this study indicate that self-care is a significant predictor of job satisfaction amongst educators in Nebraska.

Limitations to the study include sample size and diversity of the population. Future research may include a larger, more diverse population of educators across varied states and countries. Furthermore, group data could be aggregated to determine whether differences exist between novice and veteran teachers. An analysis of self-care/job satisfaction throughout the school year might also reveal chronological fluctuations. Additionally, research could be conducted to determine what forms of self-care appear to have the strongest impact on job satisfaction.

The findings of this research indicate that the greater education system should place more emphasis on self-care amongst educators in order to increase job longevity and overall levels of satisfaction. This emphasis may be particularly effective if introduced to students enrolled in teacher education programs; by educating future teachers on the importance of self-care and its relationship to job satisfaction and career longevity, they may be encouraged to begin building sustainable habits prior to entering the field that will continue to benefit them—as well as their future students—as their careers progress. Current school staff and administrators

would also benefit from recognizing the relationship between self-care and job satisfaction in order to promote healthy habits amongst current educators. The more that the education system highlights that self-care practices benefit not only the educators themselves but can also support student achievement, the more efficacious the education system can be in giving children the tools they need to achieve future success.

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Determining Lecturers' Test Scoring Knowledge by Level of Working Experience: A Case Study of Tertiary Institutions in Zamfara State

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Abstract

This paper assessed test scoring knowledge of tertiary institution lecturers in Zamfara State. It determined the proportion of low experience, quite experience, average experience and high experience lecturers with high, average and low scoring knowledge. It also finds out whether significant differences exist in lecturers' tests scoring knowledge by level of working experience. The paper answered one research question and tested one hypothesis at 0.05 level of significance. Population of this study consists of 300 lecturers in Zamfara State that were sampled through multi stage cluster sampling. Survey design was employed for the study. Teachers Test Scoring Scale (TTSS) was adopted as instrument of data collection. Similarly, out of 300 instruments administered to lecturers only 289 were retrieved, yielding 96.3% response rate. Analysis of Variance (ANOVA) was used for the analysis of data. The result of the study revealed that tertiary institution lecturers in Zamfara state are knowledgeable of test scoring and that their scoring knowledge does not differ significantly by level of working experience. The study recommended in-service training, workshop, monitoring of assessment from test construction, administration to test scoring. It also recommended creation of assessment policy such as preparing marking scheme in tertiary institution.

Key Words: Test Scoring Knowledge, lecturers Level of working experience.

Introduction

Tertiary institutions were established for the purpose of post secondary school teaching and learning. In order to ascertain whether or not learning has taking place, lecturers try to evaluate students. This process of evaluating learners is commonly known as assessment. It is the process by which lecturers collect data about overall learning progress for students' promotion, placement and graduation. Evaluating students' learning progress and achievement is determine using scores obtained from instrument known as Test. The Federal Republic of Nigeria, (FRN, 2004) recognized the importance of test in certification of tertiary institution students when it stated succinctly that; certification of tertiary institution students shall be based on overall test scores obtained by them from series of continuous measurements and judgment in form of end-of semester examination. Test scoring is therefore an essential component of assessment that is gaining increasing attention in education in recent years. Educational researchers now recognized that test scoring knowledge act as instrument through which both lecturers and students can benefit enormously. Sidhu, (2005) put forth

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that “scoring is a relative judgment of student’s item response”. It is an aspect of testing that has to do with making judgment about response to test items and assigning numerical values to the responses. In particular, Sidhu, (2005) point out the functions of test scores is to provide feedback to lecturers and students regarding extent to which instructional objectives are achieved, account to parent on the achievement and progress of their children, help in identifying student academic areas of strength and weakness and determining students’ promotion, placement and graduation. The role of scores is very important as tertiary institution rely on them to account for students’ learning outcome. Test scores do not only provide extent of mental ability of learners in tertiary institutions. Rather it provides extent of other aspect of human behavior such interest and attitude. From the point of view of lecturers knowledge of other aspect of behavior places them in a strong point to utilize such information for educational and vocational purposes. Lecturers function not only as instructors but counselors and psychologist, using test scores they assist students whose performance are affected by attitude and interest with counseling advice like inter faculty, change of course, deferring program or even withdrawal. Hence, test scores have become an important aspect of our educational culture that both lecturers and students attach great importance not only to scores but also how the scores was conducted and the relationship between the scores and grades that are awarded. Meanwhile, according to Osuji, Okonkwo, & Nnachi, (2006) there are different tests scoring techniques, and the use of a particular technique is determined by examinee freedom of expression. Multiple choice tests are scored via: Strip key; in this method answers to tests items are scored by direct comparison of the examinees answer with the marking keys. Scoring stencils: this is prepared by pending holes on blank answer sheet where the correct answers are supposed to appear. Scoring is then done by laying the stencils over each sheet and numbers of answers checks through the holes are counted. Machine Scoring: this involved scoring students response with computer and other possible scoring devices using certified answer keys prepared for the tests item. While essay tests are scored through: analytical or point method: in this method each answer is compared with already prepared ideal marking scheme (scoring key) and marks are assigned according to the adequacy of the answer. Global method: In this method examiner first sort the responses into categories of varying quality base on his general impression on reading the responses. The motivation behind this study is to seek whether lecturers are equip with efficient and appropriate test scoring knowledge that will enable them evaluate student fairly and effectively.

However, the consistency of any education system especially tertiary institution relies upon the quality and competence of lecturers, hence become the most important factor in tertiary institution system. This is because they are the main focus in learning process and outcome of learning depend on lecturers. Meanwhile, students learning cannot be complete until when their taught are assessed through test, otherwise known to be the systematic method of gathering data that will be use to judge students’ level or degree of performance. Test undergo construction, administration and scoring and the later which is the area of concern require possession of sufficient and appropriate skill and knowledge in selecting and employing consistence and appropriate scoring strategies. The National Council on Measurement in Education (NCME) have developed standards for Educational Assessment, among the standard is describing the knowledge and skills of selecting and employing appropriate scoring strategies. Meanwhile knowledge of test scoring among lecturers can vary as a result of many factors some of which are their field of knowledge, qualification and years of working experience. Others include age, gender, attitude, perception and competence among others. However, in this paper lecturers in tertiary institutions were reviewed by level or years of lecturers’ working experience. Due to the fact that, the higher the extent of working experience, the higher the chances of exposure to different scenarios concerning test scoring. Therefore the study reviewed lecturers’ test scoring knowledge by level

of working experience to determine their proportion and finds out whether the differences exist in level of working experience can influence test scoring.

However, from personal experience tertiary institution lecturers in Zamfara State seem to have insufficient test scoring knowledge; they rather score students' test script without adopting any scoring technique and without developing marking scheme. They also fill reluctant in going through any requisite procedure of test scoring. Past researches such as Sani (2014), Hamman-tukur, & Hamafyelto, (2015), Bello (2018) has shown lack of adequate knowledge base regarding the test scoring strategies; limited training in assessment and failure to employ and adhere to measurement guideline learned in pre-service/in-service measurement courses. Per halves, insufficient test scoring knowledge affects tertiary institution assessment process by hindering determining students learning outcome and will go long way to establish student mistrust and unacceptability of scores from lecturers. Similarly, it affect Cumulative Grade Points Average (CGPA) earn by students after graduation, that is error score which may be higher or lower than the true score, this can have serious implication as qualified applicant is rule out for being accepted for a job and lead to incorrect job placement to applicant who lack required skills. Hence, this research determines proportion of lecturers with high, moderate and low test scoring knowledge and also investigates test scoring knowledge differences (if any) on lecturer's field of knowledge.

The result of the studies makes an input in the present state of tests scoring knowledge in tertiary institutions of Nigeria. It help tertiary institutions determine the existence or other wise of inadequate scoring knowledge among their lectures and need for in-service training on assessment practice. And also the result of this studies encourage tertiary institution to enforce rigorous use of assessment skills through ensuring that lecturers have the necessary knowledge, skills and attitude on marking/scoring tests which is important in improving assessment practice. The outcome of this studies provide additional knowledge of establishing valid, reliable, accurate test scores, which go long way to establish student trust and acceptability of scores from lecturers. The result of this study probably convinced student, parents and the general public that the cumulative grade points awarded to students (CGPA) can be valid. The study also adds to body of knowledge on scoring/marking at school level and how lecturers should mark or score tests.

The study was conducted in Zamfara State of Nigeria, and the scope cover all lecturers of university, colleges of education and polytechnics in the state with different qualification and field of knowledge, as well as years of working experience. Furthermore, the study focuses on investigating lecturers' test scoring knowledge proportion. Theoretically, Classical Test Theory (CTT) was use for the study, due to its relevance to test scoring.

The study excluded variables like age, teaching subject and gender. Similarly, the study also excluded Monotechnics lecturers (such as College of Health Technology Tsafe, School of Nursing and Midwifery Gusau, College of Agricultural Science Bakura, etc) in Zamfara State, it also excluded lectures of Distance learning institution such as National Open University of Nigeria (NOUN), National Teachers Institution (NTI) as well as Lecturers of Private tertiary institution in Zamfara State. Item Response Theory (IRT) was delimited from the study.

Objectives of the Study

The objectives of the study were to determine:

- i. The proportion of lower experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State.

- ii. The test scoring knowledge difference among lower experienced, quite experienced, average experienced and high experienced lecturers in Zamfara State.

Research Question

The study answered this research question.

What is the proportion of lower experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State?

Research Hypothesis

The study formulated and tested hypothesis below at 0.05 level of significance

There is no significant difference in the mean score of test scoring knowledge among lower experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State.

Methodology

Survey design was adopted for the study. This is because survey designs are procedure in quantitative research that gathers data from sample of population to represent entire population at a particular point in time with intention of describing the nature of existing condition or identifying standard condition that can be compared (Cohen, Manion & Morrison, 2007). Therefore, it enables the researcher gather descriptive data from sample of lecturers to enable generalization on the entire lecturers in the study area about their test scoring knowledge. Survey design also enable the researcher find out whether test scoring knowledge differences exist among lectures based on field of knowledge.

The population of the study comprises all lecturers in Zamfara State. According to Zamfara State Directorate for Higher Education (2020), they were one thousand nine hundred and eighteen (1918) lecturers (comprising of males 1542 and 376 females) from tertiary institution in Zamfara State. This shows that about 80% of the lecturers were male, while 20% were female. The lecturers in university were six hundred and three (603 [32%]), colleges of education, five hundred and ninety seven (597 [31%]) and polytechnics, seven hundred and eighteen (718 [37%]). The lecturers are of different in field of knowledge (i.e. Education, Engineering, Humanities, Science, Social and Management Science). A sample size of 300 was used in this study based on the recommendation of Research Advisors (2006) table for determination of sample size. Research Advisors 2006 is a set of sample size level of about 500 to optimally estimate a single population parameter set by professional researchers (Krejcie & Morgan 2017). In drawing sample size, multi-stages cluster sampling technique was used in this study. This is because multi-stage sampling entails two or more stages of random sampling based on hierarchical structure of natural clusters within the population (Sedgwick, 2015).

‘Teachers Test Scoring Scale (TTSS)’ was adapted as an instrument of data collection. TTSS was subjected to Content Validity Index (CVI) by administering it to panel of ten (10) experts for determining degree of item relevance using four scales of relevance Index which revealed average proportion of relevance across all items (S-CVI/Ave) as .95 and average of universal agreement across all items (S-CVI/UA) as .88, and thus considered valid. Similarly, TTSS was pilot tested to thirty (30) lecturers in Zamfara State. The internal

consistency reliability Test-retest reliability was used and coefficient of .86 was obtained using Pearson product Moment Correlation (PPMC). Hence, considered relative strong and highly reliable in assessing lecturers test scoring knowledge.

The data of this study was analyzed using Statistical Package for Social Sciences (SPSS version 25). The research question was answered using descriptive statistics in the form of frequency count and simple percentages. One hypothesis was tested using inferential statistics in the form of ANOVA. According to Cohen, Manion & Morrison, (2007) ANOVA is premised on the same assumption as t-test, that is random sampling, normal distribution of scores, homogeneity of variance, parametric data and it can be used with three or more groups.

Results of the Finding

4.3.1 Answer to Research Question

The research question was answered below using data organization

Research Question: What is the proportion of low experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State?

Table 1	Proportion of low experienced, quite experienced, average experienced and highly experienced lecturers' with High, Average and Low Test Scoring Knowledge in Zamfara State.					
	Low Knowledge		Average Knowledge		High Knowledge	
	Freq.	%	Freq.	%	Freq.	%
Low Experienced	10	27	62	33	21	34
Quite Experienced	13	35	60	31	15	24
Average Experienced	05	14	35	19	07	11
Highly Experienced	09	24	33	17	19	31
Total	37		190		62	

Table 1 shows that 27%, 33% and 34% of lecturers with low experienced have low, average and high knowledge of test scoring respectively. It also revealed that 35%, 31% and 24% of quite experienced lecturers have low, average and high knowledge of test scoring knowledge. The table also revealed that 14%, 19% and 11% of average experience lecturers have low, average and high knowledge of test scoring. Lastly, 24%, 17% and 31% of high experienced have low, average and high knowledge of test scoring knowledge.

Hypotheses Testing

One hypothesis was raised and tested at 0.05 level of significance.

Hypothesis: There is no significant difference in the mean score of test scoring knowledge among lower experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State.

Table 2	Descriptive Statistics on Lecturers' Test Scoring Knowledge by levels of Working Experience in Zamfara State.			
Level of Working Experience	Mean	N	S.D	Std. Error
Low Experienced	16.35	93	2.903	.30431
Quite Experienced	16.00	88	2.881	.30709
Average Experienced	16.19	47	2.726	.39349
Highly Experienced	16.50	61	3.082	.39144

Table 2 above shows the mean scores of lecturers' test scoring knowledge based on years of working experience. From the mean lecturers with high working experience had the highest mean scores of 16.50, followed by lecturers with low working experience with a mean score of 16.35, then quite working experience with 16.19 mean and at the bottom end were lecturers with average working experience with 16.00 mean scores.

Table 3	Analysis of Variance of Lecturers' Test Scoring Knowledge by levels of Working Experience in Zamfara State.			
Test-Scoring Knowledge	Sum of Square	Df	F-cal	Sig.
Between Groups	24.718	15	1.325	.186
Within Groups	339.580	273		
Total	364.298	288		

Table 3 shows Analysis of Variance of lecturers' test scoring knowledge by years working experience. From the table, the p-value of .186 is greater than α level of 0.05 level of significance with degree of freedom 15. Thus, the null hypothesis, which stated that there is no significant difference in lecturers' knowledge of test scoring by years of working experience, is therefore accepted. Meanwhile no significant difference was observed in lecturers' knowledge of test scoring among lecturers' of different years of working experience.

Discussion of Findings

The finding from the study revealed 35%, 31% and 24% of quite experienced have low, average and high knowledge of test scoring knowledge lecturers. It also revealed that 14%, 19% and 11% of average experience lecturers have low, average and high knowledge of test scoring. Lastly, 24%, 17% and 31% of high experienced have low, average and high knowledge of test scoring knowledge. The variation in scores used to determine proportion of lecturers with high, average and low knowledge of test of scoring may be due to lecturers' attitude, competence, perception or ability, and may also occur due to numerous factors such as guessing or fatigue. It also revealed that lecturers in Zamfara state do not significantly differ in knowledge of test scoring by level of working experience.

The finding in this study is in compliance with theoretical assumptions of classical test theory (CTT) which reflected that each person has true score or error score on the trait being measured, been it a body of knowledge or competence in a skill. Similarly, Abdulrashid,. (2012), McMorris, & Boothnoid, (2013), Sani (2014)

and Bello, (2018), Compare to this study, they are in agreement as they revealed teachers are knowledgeable of test scoring and there is no significance difference among respondent in test scoring knowledge by years/ level of working experienced.

Finally, the result of this study revealed no significance difference in lecturers test scoring knowledge among lower experienced, quite experienced, average experienced and high experienced lecturers with high, average and low test scoring knowledge in Zamfara State. This can be ascribe to the fact that instrument of data collected (i.e. TTSS) administered to lecturers was not completed instantly. They filled the TTSS at interval of days and weeks which is considered as the major factor that affect the data collected, result and conclusion of the study. Therefore future researchers on this area are recommended to take note of this problem and try to minimize this problem in order to prevent it influence on data collected, result of the study and conclusion.

Conclusions

Despite the personal experience which seem that tertiary institution lecturers in Zamfara state have insufficient test scoring knowledge. From the findings of this study, it can be concluded that tertiary institution lecturers in Zamfara State are knowledgeable on test scoring, and their knowledge of test scoring relatively remains high across all level of working experience. It can also be concluded that lecturers test scoring knowledge do not differ significantly by level of working experience. This means lecturer's test scoring knowledge was not affected by field of knowledge.

Recommendation

Based on the findings the study recommends the following:

1. Tertiary institutions, Ministry of education and high profile educational stake holders should ensure lecturers are trained on essential concept, principles, techniques and procedure of test scoring through in-service training and workshop.
2. Tertiary institutions should have policy on examination/test scoring such as preparing marking scheme when developing a test. The marking scheme should be moderated by Head of Department.
3. Tertiary institution administration should monitor the whole assessment process from test construction, administration to test scoring and reporting.

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Early Retirement Among Teachers In Malaysia: Perceptions And Impact On Teaching Profession

Jill Ling, Fetylyana Nor Pazilah and Ong Sing Ling

Abstract

While the official retirement age for most countries is 65, employees all around the globe retire considerably earlier on average. With the retirement of the baby boomers (1946-1964) and generation X (1965-1980), increasing life expectancy (72.81 years as of 2021), and the recurrent financial crisis, most countries indefinitely want to motivate their citizens to work longer. According to the National Union of the Teaching Profession (NUTP), the early retirement application of teachers annually can affect the quality of the education system. Even though a widespread early exit culture exists among teachers with teacher shortages nationwide, little attention has been given to its determinants. Hence, this preliminary study aimed to explore teachers' perceptions of early retirement and its impact on the teaching profession. A qualitative method was conducted through semi-structured interviews and document analysis. The findings showed that poor health, family concerns, poor organisational support, low motivation, excessive workload and online learning challenges influenced the premature retirement decision that impacted the teaching quality, teacher supply, education goals, student development, turnover intention and education funding. It is hoped that this study can maximise teacher retention and initiate education reform. Future research can further look into the post-retirement strategies employed by the teachers.

Key Words: Early retirement, Teachers, Perceptions, Impact, Teaching profession

Introduction

In line with the sustainable development goals (SDGs) in education, teachers serve as a prominent enabler and resource to transform Malaysia into a developed country and realise its educational aim of “no one left behind”. However, the number of teachers' turnover is on the rise. In a statement on April 18, 2022, the NUTP estimated that more than 10,000 teachers have been submitting their papers annually for early retirement over the last few years. This figure far exceeds the Education Ministry's statistics released on November 9, 2021, with a total of 4,360 optional retirement applications submitted since January 2021. If the estimates made by the NUTP are true, then the pattern of early retirement, quitting and leaving the teaching service is very worrying (Luqman, 2022). In fact, teachers in Malaysia can request for early retirement at the age of 40 after ten years of employment, earning full pension at the age of 55. With these new laws and options, many

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teachers opt to retire early. The loss of seasoned teachers will impact the quality of the education system, current workforce, the achievement of educational objectives and the standard of instructions, yet little has been done to study what causes early retirement and its effects. Thus, this study aimed to explore the reasons why teachers retire early and its impact. The research objectives for this topic are two-fold: (1) to find out teachers' perceptions towards early retirement, and (2) to examine to what extent early retirement impacts the teaching profession. The research questions for this study are:

- (1) What are teachers' perceptions of early retirement?
- (2) To what extent does early retirement impact the teaching profession?

This study offers fresh perspectives on the causes of early teacher departure and the effects of this trend on the education system and the provision of teaching services in schools. The sample includes teachers who have the intention to leave the profession before the official retirement age in both public and private learning institutions. It is hoped that this study will improve understanding of this phenomenon and give guidance to the Malaysian Ministry of Education (MOE) in aiding decision-makers in selecting which regulations to revise or streamline. The NUTP may benefit from the findings, which might be an accurate representation of the challenges teachers experience on a daily basis, allowing unions to engage in more required bargaining, particularly on policies.

Literature Review

Early retirement is typically defined as the practice of leaving employment before the statutory age, especially on favourable financial terms. The current statutory retirement age in Malaysia is 60. According to the Public Service Department (JPA), early retirement can be defined as a condition of leaving employment before age 60. Prior to 2012, all Malaysian government employees retired at 55 years of age. When the Minimum Retirement Age Act 2012 (MRA Act) came into effect on the 1st of July, 2013, teachers under the Ministry of Education (MOE) were given options to retire at 55 or extend to 56, 58 or 60. In this study, early retirement for Malaysian teachers refers to premature retirement before their chosen options.

In regards to the general public's attitude towards FIRE (Financial Independence, Retire Early), more than half (53%) feel positive about their journey towards achieving early retirement, indicating a favour towards retiring early (Jaafar, 2022). In educational planning especially for teacher supply, it is essential to understand the frequency and patterns of teacher attrition. Substantial pension entitlements, retired spouse, poor health, stress and ageism are some of the causes of early retirement (Kuhn et al., 2021). Lack of information technology skills, health problems, role conflict, stable finance, career satisfaction, wanting family time, filling time meaningfully, and venturing into other fields are among the factors influencing the early retirement intention of teachers in secondary schools (Norhana & Wan Ainul, 2022).

Early retirement is worryingly trending. For many, retirement is a transition into a new phase of life, long awaited freedom from work responsibilities and stress with opportunities for recreation, travel, and new routines. Many people and their families plan in an anticipation of retirement. Early teacher retirement exacerbates teacher shortage, increases teachers' workload, affects curriculum implementation, and contributes to poor students' performance

(Orina, 2014). It increases the burden of the remaining instructors and has an impact on the curriculum settings of schools. It also interferes with the school's teacher balance, demotivates other educators, and results in subpar test results (Bolarinwa, 2013).

Methodology

Design

This study employed a qualitative method. The design used to conduct this study was a multi case study in understanding the perceptions of teachers on early retirement and its impact on the teaching profession in different learning settings. Qualitative inquiry builds a complex, holistic picture of the issue, providing data that are rich in descriptions of people and conversations, not easily obtained through statistical procedures or established theories. Qualitative data were gathered via in-depth interviews, and documents related to the research topic were collected and examined. Other forms of data (descriptions, field notes and oral responses) were collected and ascribed meaning for a rigorous analysis of the research topic. Using inter-rater reliability, a rater agreement of 90 per cent was reached with a substantial agreement of 0.61. Therefore, the data and related interpretation were considered valid.

Instrument

Via verbal descriptions, how the issue affects the teachers who experience the phenomenon first-hand was interpreted and findings were presented from their reflective perspectives. An interview is one of the most significant data sources for qualitative method as it provides a more detailed analysis (Adhabi & Anozie, 2017). The semi-structured face-to-face interviews and open-ended questionnaire allow the individuals to provide their opinions and respond spontaneously. The research was taken from a bottom-up perspective to find answers using a small sample researched over time through detailed, in-depth data collection involving multiple sources in a rich context. As an invaluable research tool and a part of triangulation, document analysis incorporates coding content into themes similar to how interview transcripts are analysed. Corroborating findings across data sets can reduce the impact of potential bias by examining information collected through different methods (Creswell, 2012). For this study, documents such as transcripts, reports, journals, newspapers, blogs, media posts and letters that provide confirmatory evidence of the information obtained from the interviews were examined.

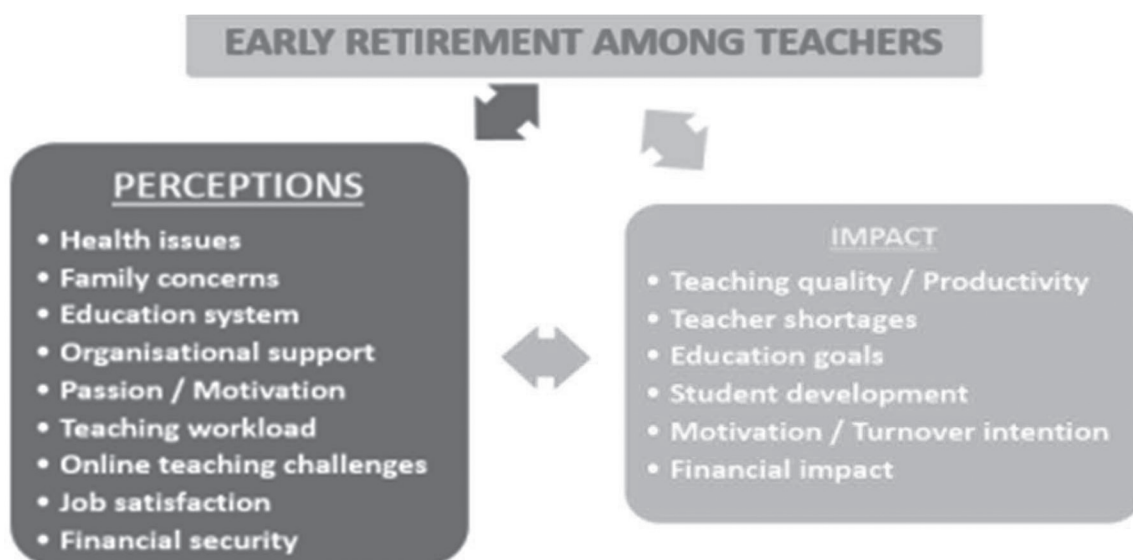
Participants

Upon reaching saturation, three essential key informants that fulfilled the criteria were identified and interviewed. Purposive or criterion-based sampling was used to locate the best participants possible to ensure heterogeneity among participants. They have impressive years of experience in the teaching profession (at least 20 years in the teaching force), either in public government schools or private institutions (primary, secondary and tertiary education) and they are in their forties to fifties, an age group close to retirement, the research topic.

Table 1 Criteria of the Key Informants

Criteria	KI 1	KI 2	KI 3
Age	43	55	49
Gender	Female	Female	Female
Marital status	Married	Divorced	Married
School/Institution	Private University	National secondary school	National-type primary school
Education Level	Master	Degree	Diploma
Location	City	City	Remote
Post	Senior Lecturer	Teacher	Teacher
Subjects taught	Computer Science	Malay Language	Science Moral Studies Mathematics
Years of teaching	20	30	27

The qualitative data collected were analysed using these two-step matrix-analysis procedures. To begin with, the interview transcripts along with the audio and video recording were compared with the data collected. Relevant documents, strongly related to the main themes and supported the outcomes of the interviews, were sourced and utilised. The data were analysed using thematic analysis using the four stages proposed by Cohen, Manion, and Morrison (2007). The data were later sub-themed and coded based on the informants' responses.

**Figure 1:** Early Retirement Perceptions and Its Impact

Findings

All the data collected for the research topic were analysed. Sections of the data (audio/video recording of interviews and interview transcripts, and documents) that correspond to various themes established and relevant to the research objectives were indexed. There are three themes: perceptions and impact. Under each theme, the data were further categorised into various sub-themes. Subsequently, emergent codes were derived from the sub-themes. Data samples for each theme were identified and a chart for all the data collected was prepared. Based on the data collected, there are a total of nine themes under perceptions and six themes under impact of early retirement. Below are the themes gathered from the data:

Discussion

Perceptions

Retirement can be defined as withdrawal from a position or service, going away, retreating, or removal from work. From the perspectives of the key informants, KI 1 explained it as “being free from work or services, leaving employment and enjoying one’s freedom”. Meanwhile, KI 2 viewed it as “giving up on a job before the actual age of retirement, probably 55”. As for KI 3, “if one retires early, he or she opts for the tenure to end sooner than planned, ceasing work and deciding to become unemployed at a younger than supposed age”. All three key informants have the desire to retire early but are concerned about post-retirement.

a. Health issues

Teachers quit early due to some personal reasons. According to KI 1, it might be due to failure to cope with accumulative stress, depression or health issues like high blood pressure, backache, leg pain and others. In the past, most teachers would complete their service and only those with health conditions considered retiring early, but this is not the case now. KI 2 shared that “teachers have to deal with pent-up frustration, high occupational stress level and mental health issues”. Many teachers suffer from emotional stress, thus prompting them to retire early as a means of protecting themselves (Lihan, 2022). Kan and Rajendran (2019) stated health as one of the determinants of intention to retire other than financial resources.

b. Family concerns

Family concerns such as financial needs, spousal capability, child support and education funds hinder one to retire early. KI 2 agreed that one may give up on teaching to take care of the kids or elders since the costs of sending kids to child care centres or the parents to nursing care are increasing. Deputy Minister of Education, Datuk P. Kamalanathan attributed early retirement to health and personal problems alongside family issues (Malay Mail, 2017).

c. Education system

The flip-flops in education policies are among the factors that pushed teachers to quit early. Unclear directives from education authorities, ever-changing policies and incompetent leadership in some education arenas are some of the factors teachers quit (Mallika, 2022). Some teachers feel impotent because they are unable to question the system or propose ideas that might work better due to the unchallenged top-to-bottom approach whereby dissenting opinions are not welcomed. This is expressed by KI 1, “the teachers complained that they have to fake the data just to get the types of results those up the ladders want”.

d. Organisational support

Organisational support from the stakeholders is important to ensure teacher retention. KI 1 reasoned teachers' early retirement to their dislike of dealing with parents, students' attitudes and disciplinary issues, while some are unhappy with the school management. As KI 2 put it, "some teachers quit because of the conflicts or disagreements they have with the principal, other colleagues, parents, and students. Some are not satisfied with the current system". Educators who are leaving the service early complain of overwork and bureaucrats who do not listen to their grievances (Dhesegaan, 2022). They lack resources, support and encouragement yet are still expected to perform despite these shortcomings (Salim, 2022).

e. Passion / Motivation

Motivation, both extrinsic and intrinsic, keeps teachers' passion burning. KI 2 shared that teachers may lose their enthusiasm if teaching is dull, monotonous and unchallenging day-to-day task. KI 3 claimed that "motivation will be low for those who anticipate retirement" and some stay in the profession "for the sake of the salary and high allowances, not purely based on interest". Too much clerical work, abrupt changes in policies, demand on teachers to go beyond teaching, frustration due to insufficient infrastructural facilities and amenities, poor or no internet connection, and unrealistic demands from parents are among the reasons given by teachers that affect their motivation (Lihan, 2022).

f. Teaching workload

Teachers' disgruntlement with increased administrative duties and non-teaching responsibilities has been a perennial issue. A teacher's workload does not solely involve teaching. KI 1 reiterated, "teachers are burdened with admin and reporting or data collection works that affect the initial passion and interest of nurturing the students". KI 3 added; teachers "have to do clerical works, printing, filing, and many more". This interferes with teaching, which has become secondary to tasks such as conducting action research and implementing programmes unrelated to their core duties (Dhesegaan, 2022). Prioritising non-teaching work, over what they love most - educating their students, drives teachers to quit. All the paperwork related tasks become a priority, reducing the time for lesson preparation (Salim, 2022).

g. Online teaching challenges

Some teachers quit due to challenges faced since the COVID-19 pandemic struck in 2020 when schools switched to online learning during the Movement Control Order (MCO) which tested teachers' emotional and psychological resilience. According to KI 3, the senior teachers "find it hard to cope with this new paradigm shift which requires them to learn how to be tech-savvy". Teachers who have been in the service for many years may show some resistance or reluctance to adapt to the changes in the teaching and learning modes, modalities, platforms and assessment methods, thus, resorting to early retirement. Malaysia is losing experienced teachers due to the pandemic, coupled with the increasing non-teaching responsibilities that contribute to the matter where some teachers retire in their early or mid-50 (Luqman, 2022). Poor internet connection also compounds the problem, stressing teachers out because it not only disrupts their teaching but causes much anxiety with some parents piling on the pressure.

h. Job satisfaction

Teacher satisfaction has a reverse effect on the intention to withdraw early. Teachers are required to upgrade their knowledge and skills in their pursuit of professional development. Hence, the Continuous Professional Programme (CPD) has been implemented since 2020 (Chua, 2022). Ever since the pandemic, teachers have to come to terms with the fact that new skills are needed for the reimagining of education in a hybrid space with the ongoing emphasis on student-centred pedagogy (Mallika, 2022). The change in the education landscape and the transformations needed to equip the students for the 21st century may lead teachers to leave the service early. The challenges faced by teachers during the pandemic could have taken a toll on their well-being (TMV, 2022). STU received many complaints concerning home-based teaching and learning when teachers were required to key in data repeatedly (Lihan, 2022).

i. Financial security

Financial security is an important external motivator. KI 1 claimed that the only attractive factor to stay in the profession is the monthly salary. KI 2 asserted that “teachers who choose pension will retire mandatorily at 55, 60 or 65, or apply for early retirement, whereas those who opt for Employee Provident Fund (EPF) can retire anytime”. KI 3 agreed that “teaching is a stable job with a good salary and allowances besides time-based promotion”. Monetary or financial gain may be one of the factors that pull teachers back into service (Amzat et al., 2021). In government schools or institutions, promotion is largely time-based according to scales. According to a recent survey by Milieu Insight, a consumer data and analytics company which utilised FIRE, employed respondents aged 18 to 49 years old revealed that while many aspire to retire early, only 12 per cent of Malaysians are on track for early retirement, with 55 per cent of them unsure of how to achieve financial independence to retire early (Jaafar, 2022).

Impact

In this study, several impacts were identified. Having educators, especially the experienced ones, retiring early is a huge loss to the country and if the situation persists, the nation will face a critical education crisis and it would erode the quality and competitiveness of the Malaysian education system (TMV, 2022). The aspiration to make Malaysian schools and the quality of education on par with the international level will be affected (Malaysia Gazette, 2022).

a. Teaching quality / Productivity

Early retirement of experienced teachers has an impact on the quality of the teaching. According to KI 1, the remaining teachers may need to sit in temporarily if the school does not have sufficient teachers. KI 2 further added that “there will be a shortage in certain subjects, overall influencing the balance and quota of the school”. “When there is any vacancy, the school has to wait for replacement with some hiring temporary or contract teachers to fill up the space, not necessarily with the qualifications required” (KI 3). If there are excesses in certain subjects, the teachers have to teach other subjects which are not their major or specialisation. KI 3 stated that this might be a problem which compromises the quality of education. Other than the teaching quality, teachers’ productivity will also be affected.

b. Teacher shortages

“The old generation who excels in a particular major will be phased out by the new generation” (KI 1). KI 2 claimed that the existing teachers have to do extra tasks on behalf of the retirees. KI 3 described retirees as teachers with valuable experiences who are “good at teaching, maintaining the disciplines of notorious kids, and also skills that can be shared with the newbies who lack all these”. The older employees aged over 50 years, competent, capable, and committed to work, are valuable assets and the government want these experienced people to remain in the organisation for longer periods. Efforts to keep employees with the skills, experience and expertise are very significant human resources to continue organisational success and excellence (Chabaya, Tshephe & Molotsi, 2014; Hobfoll, 2011).

c. Education goals

Curriculum implementation will be affected when teachers opt for early retirement. For every subject or course, there is a syllabus to complete and learning outcomes to achieve every year. When teachers retire early, the students may be left on their own halfway through their studies especially when there is a shortage of teachers in a particular field. The education ministry hired teaching assistants on a contract basis with pilot schools in Kedah, Sabah and Melaka to reduce the workload of teachers as an effort to keep teachers in the teaching service. It was highly successful but terminated due to a lack of funds (Parkaran, 2022).

d. Student development

The Malaysia Education Development Plan (2013–2025) states that there is a direct correlation between teacher quality and student achievement. Experienced teachers have a significant impact on students’ academic achievement, personal growth, and the advancement of education. In terms of student development, KI 1 indicated that “the students will lose good teachers who can develop them through valuable experience”. Students’ progress or performance will be affected. Early retirement among teachers is a worrying trend as experienced teachers are an important catalyst in advancing the nation and country, an extraordinary influence on shaping the personality and thinking of the next generation.

e. Motivation / Turnover intention

Early retirement among teachers will also have an impact on the motivation of other teachers to continue serving in the profession. It will result in turnover intention. As KI 1 put it, “they will view it as the exemplary to follow”. KI 2 described it as “a chain-effect whereby one follows another as they will have the urge to resign or retire as well”. Teachers have been complaining about doing work which is not their core job which leads to occupational stress and burnout prompting early retirement (Lihan, 2022). NUTP is worried that with the increasing number of teachers opting to retire early, the problem will become serious if nothing is done to stem the tide (Parkaran, 2022). Conversely, the Conservation of Resource theory (COR) stressed the need to safeguard and conserve key organisational resources, long-serving and experienced, credible and competent employees (Hobfoll, 2011).

f. Financial impact

Teacher training is a common practice and requirement before a teacher is hired as a qualified teacher in a certain major or specialisation. When more teachers are opting for early retirement, the government has

to spend more on training, interviewing and hiring new teachers, as purported by KI 1 that claimed: “our country might face funding or budget problems in recruitment, pre or in-service training of teachers, and posting of teachers”. This is supported by KI 3; “once a teacher retires earlier than compulsory, they (the government) need to fill the gap by going through the process again”. NUTP secretary-general Wang stated that replacing retirees with fresh graduates will not solve the problem overnight as the newbies will take years to fit into the system and become effective teachers (Pakaran, 2022).

Conclusion

This study has explored the issue of early retirement among teachers with their perceptions as well as the impact on the teaching profession. The findings of the study showed that personal issues, flip-flops in education systems, inadequate organisational support, lack of passion or motivation, excessive teaching workload, online learning challenges, low job satisfaction and financial security influenced the premature retirement decision that impacted the teaching quality, teacher supply, education goals, student development, turnover intention and education funding. From the findings, it can be concluded that teachers have various reasons to quit along with impact on the overall quality of education. Retirement is a transitional stage of life that can be a pleasant experience for some, yet traumatic for others. Instead of early retirement, there may be ways to chart a middle course by cutting back on work without fully retiring.

Recommendations

A concerted effort has to take place to reduce the early retirement among the teachers to increase their motivation to be committed to the task of promoting the continuity of the nation’s education transformation until their mandatory retirement age. Based on the findings, it is recommended that the new policy enabling teachers to retire at 40 after 10 years of service be looked into and revised to discourage early retirement. Teachers should focus on their core duty of teaching instead of other administrative tasks that can be taken over by clerks or teaching assistants. A mentor-mentee programme can be initiated for the novice or young teachers to be trained on the job under experienced veterans. In terms of organisational support, expert teachers should remain on the field and not be made education officers who prioritise documentation and administrative data over teaching. Moreover, teacher candidates should be screened before the interview and training. Taking after exemplary Singapore and Finland, only the best and qualified persons will be selected to be in the profession. Directives should be properly coordinated among education officers at the different levels: district, state and national for better attainment of educational goals. Teachers should be given the option to apply for sabbatical or unpaid leave to tend to their personal issues such as health and family concerns.

Implications

If many teachers end their careers when they are still productive and can contribute effectively, something must be wrong with the Ministry of Education (MOE) and teachers’ welfare must be prioritised and cannot be compromised (Malaysia Gazette, 2022). Amzat (2021) suggested these recommendations to manage the issue of teacher burnout and retain teachers by providing training and development activities for teachers, increasing salaries, helping teachers develop coping strategies, and creating adequate support systems.

Teachers retain and perform in an organisation when they are valued, motivated and satisfied with their jobs and their professional status (Khawary & Ali, 2015). Once the teachers enjoy what they do with adequate support, they will remain in the profession longer and this will keep early retirement at bay. Future research can be directed to post-retirement strategies employed by the teachers and this study can be replicated to involve more teachers from different settings to make the findings generalisable to the whole population. Through this preliminary study along with its findings and recommendations, it is hoped that teacher retention can be maximised and an education reform can be initiated to nip early retirement in the bud.

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“Chipping the Genes”. Game-Based Learning Approach in Genetics-A Case of Monohybrid and Dihybrid Crosses and Interpretation

Glaiza P. Alair and Carmen P. Guilaran

Abstract

The main purpose of this study was to find out whether the use of a “**Chipping the Genes**”, a game-based learning approach in Genetics, would be effective in increasing the academic performance of Grade-8 students of Bai Saripinang National High School for the SY: 2019-2020.

This was an experimental research using the pretest and post-test design involving the five sections of Grade-8 Joy, Love, Charity, Chastity and Generosity. The respondents of the study were the students who did not reach the mastery level of the learning competencies in Genetics giving a total of 47 students. The respondents were given a 20-item teacher-made test as their pre-test and post-test. The statistical tools were employed using mean, standard deviation and t-test for independent samples.

Comparing the two groups, those who have undergone the use of educational board games as a learning approach in Genetics had a greater number of students whose performance belonged to Satisfactory and above than those who did not. Eighteen (18) or 59 percent are for those who were taught with Strategic Intervention materials while those who were not had 11 or 42 percent satisfactory and above.

Generally, these results implied that the use of a game-based learning approach in Genetics was effective in improving the academic performance of the Grade-8 students.

Key Words: Genetics, Game-based learning approach and Academic performance

Context and Rationale

Genetics helps explaining lots of things around us, like what makes you distinctive, why you look like other members of your family, why you are taller than the others and why some diseases run in your family, but learning genetics is often thought of as a subject or a topic in biology that is difficult to learn and understand, especially for novices. It has been observed that one common problem encountered by the students in the biological sciences is difficulty in understanding biological concepts.

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Due to the nature of the subject matter and the way learning processes occur and, possibly, the way it is being taught, the understanding of genetics ideas of the majority of students is thought to be very poor and full of confusion and alternative views (Chu, 2008). In the study of Longden (2010), he found the misconceptions and learning difficulties of the students were related to the nature of the concepts used in genetics.

Franklin (2003) noted that educational games have favourable characteristics for use in science education. One of the main ways to use games in science is to reinforce basic facts and principles. Psychologists such as Jean Piaget and Jerome Bruner, believe that play is a child's work. The effective way to teach pupils or students, they say, is through hands-on, active learning. That's where game-based learning comes in. Game-based learning refers to the borrowing of certain gaming principles and applying them to real-life settings to engage users (Trybus, 2015). With this approach, students are allowed to engage with educational materials in a playful and dynamic way.

Games make learning concepts more palatable for students and supply learners with a platform for their creative thoughts to bounce around. Effectiveness of an educational card game in reinforcing biological concepts in comparison with traditional teaching methods was found in the study of Gutierrez (2013). Educational games encourage creative behaviour and divergent thought and are excellent ice breakers (Fuszard, 2001).

Pho and Dinscore (2015) pointed out that game-based learning is not just creating games for students to play, it is designing learning activities that can incrementally introduce concepts, and guide users towards an end goal. Learning and play aren't at odds with each other, in fact, games are the vehicle and environment for learning.

In this study, researchers embarked on using "**Chipping the Genes**", a game-based learning approach in genetics for the concepts of monohybrid and dihybrid crosses and interpretation that will enrich learning of the Grade-8 students, thus attain growth in their academic performance.

Research Questions

The study investigated the effectiveness of "**Chipping the Genes**" in learning genetics of Grade-8 students enrolled in Bai Saripinang National High School, Bagumbayan, Sultan Kudarat during the School Year 2019-2020.

Specifically, it sought answers to the following questions:

1. What is the level of academic performance in Science of the Grade 8 students before the conduct of the study?
2. What is their academic performance in Science after the conduct of the study using the two strategies?
 - 2.1 Traditional Method (using Grade-8 Science Module)
 - 2.2 "**Chipping the Genes**" learning approach in Genetics
3. Is there a significant difference between the pre-test results of experimental and control groups?
4. Is there a significant difference between the post-test results of experimental and control groups?

Hypotheses

Sub-problems 1 and 2 were hypothesis free.

For sub-problem 3 and 4:

H_3 : There is no significant difference between the pre-test results of experimental and control groups.

H_4 : There is no significant difference between the post-test results of experimental and control groups.

Conceptual Framework

Innovation, Intervention and Strategy

This study used the “**Chipping the Genes**” learning approach in Genetics concepts of monohybrid and dihybrid crosses and interpretation. In this approach, the researchers employed the use of educational board games. The chips were used to solve monohybrid and dihybrid crosses in the Punnett Square.

The researchers referred to the revised Bloom’s Taxonomy established by Anderson and Krathwohl (2001) as the design standard for the educational board game.

- a. Remembering* – Factual knowledge: The students were asked to describe the terms used in genetics. E.g. genotype, phenotype, homozygous, heterozygous, dominant and recessive.
- b. Understanding* – Conceptual knowledge: The students explained the Law of Dominance, Law of Segregation and Law of Independent Assortment. In addition,
- c. Applying* – Meta-cognitive knowledge: The students used a Punnett square when solving for monohybrid and di-hybrid crosses with chips.
- d. Analyzing* – Procedural knowledge: The students will classify the expected genotype and phenotype of each cross.
- e. Evaluating* – Meta-cognitive knowledge: The students classified the Heterozygous (He) or Homozygous (Ho) genotype and solved for the phenotypic and genotypic ratios of any given cross and determined the expected phenotypic and genotypic ratio of each crosses.
- f. Creating* – The students choose their own alleles to cross and interpret the result.

This “**Chipping the Genes**” learning approach in Genetics serves as a tool in improving the instructional methods and strategy of teachers and makes science an interesting and enjoyable subject, so that students are motivated in understanding science concepts and principles thereby increasing their academic performance.

Literature Review

Game-based Learning Approach

A study from Vanderbilt University demonstrates the impact of rigorous, peer reviewed research into curricular tools, in this case showing that students who played educational games out performed their peers on standardized tests (Polikov, 2017). According to Bruner as stated by Nott (2016), students who engage

in hands-on learning and play-based activities experience the following benefits; increased motivation, buoyed creativity, enhanced problem-solving skills, a greater sense of personal responsibility and the joy of autonomy and independence. A card game has been developed and used to teach nomenclature of the elements and their symbols in the first laboratory session of General Chemistry. The game both helps the students learn or review the symbols of the elements (Granath and Russell, 1999).

In a classroom situation, teacher-student interactions and student-student interactions exert a profound impact on learning. Unlike interactions in digital games via computers, face-to-face interaction exposes people to human expressions, physical action, and verbal tones (Billinghurst & Kato, 2002).

Thus, using educational card games as a medium for game-based learning could enhance the direct interpersonal interaction between teachers and students as well as among students to a degree unmatched by the sound and audio effects of digital games. This study designed a science lesson using an educational card game. By handling the cards and moving the character pieces themselves and competing or cooperating with peers through direct verbal communication, students can interact with one another and learn happily from within.

Academic Performance

It is currently understood that, in order for students to be considered “fully proficient in science”, they must be able to (1) know, use, and interpret scientific explanations; (2) generate and evaluate scientific evidence and explanations; (3) understand the nature and development of scientific knowledge; and (4) participate productively in scientific practices and discourse (Duschl et al., 2007). There is a growing understanding of the role that early childhood education can play in building science literacy. Infinitely curious about the world around them, children constantly observe and explore, take in new information, and generate their own ideas about how the world works. It is now widely known that cognitive stimulation in the early years is critical for brain development and that young children have cognitive capacities far beyond what was previously believed (Shonkoff & Phillips, 2000).

Most students perceive science as very difficult, heavily content loaded, very dull and demanding passive reception rather than active involvement with the learning process (Woolnough, 1994).

With the above-mentioned problems, the teacher cannot expect much from the students in terms of the application of concepts. This may even be the reason for obtaining low scores in science examinations, as in the case of the Third International Mathematics and Science Study (TIMSS) examination where the Philippines ranked 36th in the Science test among the thirty-eight participating countries (Tan, 1999). Laviña (2000) emphasized that “the dismal result of the Third International Mathematics and Science Study (TIMSS) was a much-needed wake up call for the country”.

The achievement scores, whether in local or international examinations, are means to measure comprehension on different subject areas and highlight students’ overall academic performance. The National Achievement Test (NAT) results for Year 4 MPS by Learning Area of SY 2012-2013 and SY 2013-2014 showed Science with 42.90 and 46.43 respectively. In the division level, the Sultan Kudarat acquired a mean percentage score of Science Year 4 of 45.87 which belonged to below average. This MPS was second to the lowest in Region XII for the SY 2013-2014. As stated in the annual report of the Region XII-SOCCSKSARGEN,

sixty seven percent or 387 out of 579 secondary schools belong to quartile 3 in Year 4 science performances, which means that more than half of the total number of secondary schools obtained below average scores. Thus, the region needs to employ strategies that would improve the 28 or 5% secondary schools belonging to quartile 4.

Analysis of the test and the results Condes-Tandong showed that the Filipino students have difficulty for the following reasons: 1) they have not mastered the concepts needed to answer the items; (2) they do not understand the problem; and (3) the content related to some items is not formally taken up in the curriculum (Tandong, 2000). This implies that students do not master the concepts and lack conceptual understanding regarding the topics already covered. Enough content is covered but not much learning takes place. It is for this reason why the teaching of science must be student-centered and equipped with a variety of instructional learning strategies.

Based on the K to 12 curriculum, science subjects are learner-centered and inquiry-based, emphasizing the use of evidence in constructing explanations. Concepts and skills in Life Sciences, Physics, Chemistry, and Earth Sciences are presented with increasing levels of complexity from one grade level to another (spiral progression), thus paving the way to deeper understanding of a few concepts but there are competencies which are not mastered by the pupils and students.

In its continuing effort to raise the quality of education in the country, the Department of Education (DepEd) continuously implements innovations particularly in Science. The focus of the Science Education Program of the Basic Education Curriculum is to make learning meaningful for students, in order to improve their achievement. In fact, most of the seminars, training and scholarships sponsored by the DepEd and Department of Science and Technology (DOST) for teachers teaching science subjects have the objectives of furthering the enhancement of their knowledge and skills in delivering goods to the students.

Moreover, Shaffer (2012), added that there is a need for instructional materials to foster the active mental participation of students in the learning process. The development of a curriculum that fulfills this need should be guided by knowledge of what students know and can do, rather than by assumption about what they should be able to do.

The materials and teaching aid of the plan should provide a checklist of everything except the use to teach the lesson. In short, anything that the learner does not have you must supply (Alcantara, 2011).

In meaningful deliberation of the lesson in a teaching-learning situation, materials are used as aid to facilitate learning. Materials like cards, workbooks, modules, visual aids, pictures, graphs and flipchart greatly help the teachers and students for a meaningful outcome.

Research Methodology

Research Design

The randomized pretest-posttest control group design was employed in this study which is an experimental method of research. According to Fraenkel, Wallen, & Hyun (2012) this is a design to investigate possible cause-and-effect relationships by exposing one or more experimental groups to one or more treatment conditions and comparing the results to one or more control groups not receiving the treatment, random

assignment being essential. Two groups of subjects are used, with both groups being measured or observed twice and the first measurement serves as the pretest, the second as the posttest.

Locale of the Study

The study was conducted at Bai Saripinang National High School located at Purok Magsaysay, Bai Saripinang, Bagumbayan, Sultan Kudarat.

Respondents

The respondents of the study were the students from the (5) sections of the Grade-8 for the SY: 2019-2020. A simple random sampling was employed and Group 1 became the experimental group and Group 2 assigned as the control group.

Data Gathering Instrument

The following were the research instruments used in the study.

1. “Chipping the Genes”. A game-based learning approach in Genetics

In designing this educational board game of this study, the researchers referred to the seven design principles proposed by Liu (2011): Analyze the traits of the learners and understand their prior knowledge; establish clear teaching objectives and select appropriate gaming equipment, combine the teaching objectives with the game content; remember that teaching is the primary goal and that the game is a supplementary tool; take advantage of game characteristics to arouse student interest; enable students to enjoy learning while they take control of learning; and periodically assess learning effectiveness and improve teaching.

These educational boards underwent conceptualization and planning. For the game development, this includes designing and pre-implementation of the educational board game. For this study, the researchers selected two main topics in genetics, the monohybrid and dihybrid crosses and interpretation.

After the initial development process completed and before the actual use of the game, science teachers were asked to review and validate the educational board game based on its goals and objectives, design, components and organization, playability and playfulness, and usefulness.

2. Pre-test/ Post-test

It is a 20-items teacher-made test designed to measure the mastery level of the students on the lessons chosen by the researcher. The items in the test are analyzed and validated. The assessments were given to the participants before and after the learning activity, with the problems from the pre-test reordered in the post-test to reduce the effects of repeated exercise.

Data Gathering Procedure

A pilot pre-test was done before the experiments using the validated test items. The experimental group was exposed to the use of “Chipping the Genes” while the control group was exposed to the traditional way of teaching using the Grade-8 Module in Science. A pre-test was given to both groups before the introduction of the lesson and a post-test after the end of the lesson. The same pre-tests and post-tests were given to the experimental and control group.

Furthermore, the control group were given the same lessons, same number of contact time and rules with the experimental group. They will only differ in the instructional materials used. Their scores in every treatment were tallied and interpreted by the researcher to determine whether there were significant differences on their mean scores in the pre-tests and post-tests.

Data Analysis Plan

The following are the statistical treatment to be used in the study:

1. Mean and Mean Percentage
2. Standard deviation
3. t-test formula for independent samples

Results and Discussion

Academic Performance in Genetics of both Experimental And Control Groups

Table 1 Academic Performance Level in Science Before the Conduct of the Study					
PRE-TEST RESULT					
Academic Performance Descriptors	Scores	Frequency		Percentage	
		Experimental Group	Control Group	Experimental Group	Control Group
Above Satisfactory	15 and above	0	0	0%	0%
Satisfactory	8-14	4	5	13%	17%
Below Satisfactory	1-7	26	25	87%	83%
Total		30	30	100%	100%

The table above shows the pre-test results of the two groups. Frequency counts and percentage were employed to treat the data gathered. Majority of the respondents were found below satisfactory level of academic performance for both experimental and control groups with 26 and 26 students or 87% and 83% respectively. They were students who scored between 1-7 out of 20-item test. A total of 4 students had satisfactory level of performance in the experimental group and 5 students in the control group were also in the same level. No one had an above satisfactory level of performance in both groups.

Table 2 presents the data about the academic performance in science after the conduct of the study among the control group. It was revealed in the data that the majority of the students in the experimental group reached a satisfactory level of performance after the use of “Chipping the Genes” with a total of 17 students or 57%. Eleven (11) students or 37% of the students in the experimental group had an above satisfactory level of performance and only 2 students found below satisfactory level.

Table 2 Academic Performance Level in Science After the Conduct of the Study

POST-TEST RESULT					
Academic Performance Descriptors	Scores	Frequency		Percentage	
		Experimental Group	Control Group	Experimental Group	Control Group
Above Satisfactory	15 and above	11	2	37%	7%
Satisfactory	8-14	17	12	57%	40%
Below Satisfactory	1-7	2	16	6%	53%
Total		30	30	100%	100%

Further results show that there were 16 or 53% found to belong below Satisfactory level of performance in the control group. Fifteen (15) or 40% of the students without game-based learning approach found to be in satisfactory level and only 2 students reach the highest level of performance in the control group.

Effectiveness of the “Chipping the Genes” as learning approach in Genetics

To arrive at an answer about the sub-problem no. 3, t-test for independent samples was employed.

Table 3.1 Test for Significant Difference Between Pre-Test Results of Experimental and Control Groups

Groups	N	Mean	SD	Sig.	df	t	Interpretation	Decision
Experimental	30	6.07	1.98	.468	58	.632	Not Significant	Accept the Null Hypothesis
Control	30	5.73	2.10					

Table 3.1 shows that the Mean (x) The value obtained of the experimental group was 6.07 with SD 1.98, while the control group was 5.7 with SD 2.10, giving a difference of .34 in their means in favor of the experimental group. The results indicate that the pre-test scores of the both groups had no significant difference ($t=.632$, $p>0.05$) as shown in the table above which led to the acceptance of the null hypothesis.

Table 3.2 Test for Significant Difference Between Post-Test Results of Experimental and Control Groups

Groups	N	Mean	SD	Sig.	df	t	Interpretation	Decision
Experimental	30	12.03	2.14	.000	58	6.38	Significant	Reject the Null Hypothesis
Control	30	8.77	1.81					

Table 3.2 presents the data about the difference between the post-test scores of both groups. Experimental group has a mean of 12.03 which is greater than the mean of the control group which is 8.77 giving a difference of 3.26.

Data further reveal that the test for their difference is significant with ($t=-6.38$; $p<0.05$) which leads to reject the null hypothesis. The results indicate that the academic performance in Genetics of the two groups differ in favor of the experimental group. It meant that those students who had undergone learning the concepts of Genetics with the use of “**Chipping the Genes**” learning approach in Genetics performed better than those students taught in traditional way of teaching.

Reflection, Conclusions and Recommendations

After the conduct of the study, both methods (traditional or using the “**Chipping the Genes**”) were found to be effective methods of enhancing understanding of genetics concepts. However, students who used the “**Chipping the Genes**” had a significantly higher gain in scores than students who were exposed to the traditional methods. Thus, it has been discovered that the use of a student-centered approach like “**Chipping the Genes**” can improve student performance to a greater extent than traditional methods.

Based on the results of the study, it is concluded that:

1. Majority of the respondents were found below satisfactory levels of academic performance for both experimental and control groups.
2. Majority of the students in the experimental group who used the “**Chipping the Genes**” reached the above satisfactory levels of performance compared to the control group.
3. Before the conduct of the study, no significant difference was found between the test results of the experimental and control groups.
4. A significant difference was found between the post-test results of experimental and control groups.

In the light of the results gathered, it is recommended that:

1. The use of “**Chipping the Genes**” should be continuously observed in teaching the concepts of Genetics. If possible, additional instructional materials should be constructed and utilized in teaching Genetics.
2. School administrators and parents should support the needs of the teachers in producing more supplementary materials appropriate to the content of the subject matter to be taught. They should assist the teachers to produce desirable and interesting materials in teaching Science.
3. Students who lag behind, especially those found to be poor in their academic performance in Genetics under the control group should be given preferential attention through the conduct of remedial teaching of the subject.
4. Similar studies focused on production and validation of “**Chipping the Genes**” are recommended to be conducted in the future and if possible it is suggested to utilize other learning areas.

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A Study of the Significance of Massive Open Online Courses (MOOCs) for the Professional Development of Prospective Teachers of Undergraduate Teacher Education Programme

Dr. Amit Ahuja

Abstract

MOOCs are the globally available and accessible academic and professional courses that have migrated from the closed and limited audience in a physical classroom setting to online courses which are available to unlimited number of participants. MOOCs are a potential learning resource in teacher education and support the professional development of teachers. Literature review showed that disengagement of the participants, lack of individual interaction/ attention from the participants and failure to understand the content are some of the plausible reasons due to which most of the MOOCs participants do not complete the course. So, what kind(s) of online learning portals are available for ensuring the access, equity and quality for undergraduate teacher education course? What is the competence level of prospective teachers in using technology to promote their professional growth? How do MOOCs support the professional growth of prospective teachers? What is the perception of the prospective teachers for MOOCs with respect to their professional growth? To answer these research questions a descriptive survey research was conducted by the investigator and ten B.Ed. institutions affiliated to GGSIP university, Delhi were randomly selected for the data collection. It was found that there is a dire need to launch MOOCs through different national co-ordinators at SWAYAM for teacher education in languages other than Hindi. Majority of the prospective teachers had moderate level of competence in using technology for their professional growth. Engaging and interactive academic content, precise presentation of course objectives, assessment, feedback etc. are some of the significant criteria which a B.Ed. institution should consider for deciding and selecting a MOOC for the professional growth of prospective teachers. The study had educational implications for prospective teachers, teacher educators and curriculum planners.

Key Words: MOOCs, Professional Development, Online Learning Portals, Prospective Teachers.

Introduction

Within the domain of open learning, Massive Open Online Courses (**MOOCs**) constitute the most significant innovative movement. MOOCs are the globally available and accessible courses that have migrated from the closed, limited audience in a physical classroom setting to online courses which are open to an unlimited number of participants (**Scholz, 2013**). MOOCs have gained popularity since the year 2013. Higher education institutions offer MOOCs free of charge through the internet and partnerships with external providers such

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as Coursera and edX (**Shah, 2020**). MOOCs are among the main types of open educational resources that are digitised materials offered freely and openly for all to use and re-use for teaching, learning and research. The acknowledged advantages of MOOCs are its effectiveness as a learning tool for democratising learning by providing quality education for all (**Dillahunt et al, 2014**), internationalising higher education (**Schuwert et al., 2015**), promoting digital competence (**Aljarrah et al, 2020**), enhancing the self-regulated learning strategies (**Zhu et al, 2018**), promoting ongoing professional development and endorsing lifelong learning (**Vivian et al., 2014**) of the learners. From the learners' perspective, MOOCs allow convenience and flexibility while breaking the boundaries of time, space and learning pace, and thus overcome the obstacles like scheduling and location (**Shapiro et al., 2017**). MOOCs also offer an opportunity to study a wide array of subjects with worldwide experts in prestigious higher education institutions, experience online social interactions and promote the learning process without pressure of completion or accreditation (**Hew & Cheung, 2014** and **Koller et al., 2013**). So, how do MOOCs support the professional development of prospective teachers? What kind(s) of MOOCs are online available for the prospective teachers to enrol and pursue? How do these MOOCs ensure the access, equity and quality for the prospective teachers? Are prospective teachers technologically competent enough to complete the enrolled MOOC? What is the perception of prospective teachers for MOOCs as a learning resource? To address these aspects the present study was conducted by the investigator to explore the significance of MOOCs for the professional development of prospective teachers of undergraduate teacher education programmes.

Review of Related Literature

The review of related literature reveals that over the years, MOOCs have arisen as formative tools that may facilitate the learning process of any type of content (**Hidalgo et al 2020**). MOOCs have shown expansion at exponential rate and gained significant popularity among the students and educators (**Aguaded, 2013**). But in a broader context, still MOOCs have to go a long way in terms of satisfaction of students' needs because a high drop-out rate has been observed (**Adamopoulos, 2013**). MOOCs have become an ad-hoc solution for the difficulty that teacher educators face while teaching online (**Schmidt et al, 2022**). MOOCs are a potential resource for the higher education (**Wang & Zhu, 2019**) and serve as an effective tool for teacher education (**Montgomery et al., 2015** and **Nortvig & Gynther, 2017**) and support the professional development of in-service teachers (**Vivian et al, 2014**). MOOCs are effective in supporting the acquisition of content knowledge while the assessment, feedback and practical in-classroom skills required in teaching were deemed to be less suited to MOOCs (**Fyle, 2013**). It was also found that most of the MOOC participants do not complete the course (**Goopio & Cheung, 2021**). Among the plausible reasons for the high dropout rate and disengagement of the learners were the lack of individual interaction/ attention from the teacher and failure to understand the content (**Hone & El Said, 2016**).

To address the issue, that is the significance of MOOCs for the professional development of prospective teachers of undergraduate teacher education programme, with the help of review of related literature following research questions were formulated:

Research Questions

- i. What kind(s) of online learning portals are available for ensuring the three cardinal principles of education policy that is access, equity and quality for undergraduate teacher education courses?

- ii. What is the competence level of prospective teachers in using technology to promote their professional growth?
- iii. How do MOOCs support the professional growth of prospective teachers?
- iv. What criteria do secondary teacher education institutions adopt to facilitate the prospective teachers in selecting a MOOC for their professional growth?
- v. What is the perception of the prospective teachers for MOOCs with respect to their professional growth?

To explore the above research questions, following research objectives were framed:

Research Objectives

- i. To explore the available online learning portals for B.Ed. course with respect to free and subscribed access.
- ii. To explore the available online learning portals for B.Ed. course with respect to equity.
- iii. To explore the available online learning portals for B.Ed. course with respect to quality content.
- iv. To explore the competence level of prospective teachers in using technology to promote their professional growth.
- v. To study the criteria adopted by B.Ed. institutions in selecting a MOOC for the professional growth of prospective teachers.
- vi. To gauge the self-concept of the prospective teachers with respect to technology in promoting their professional growth.

Methodology

The investigator explored the professional significance of MOOCs for prospective teachers enrolled in the secondary teacher education institutions affiliated to GGSIP University, Delhi so, descriptive survey research design was employed.

Definition of key terms:

Professional development: A process of developing the competency of teachers in learning new concepts and adopting a new teaching methodology to excel in a professionally changing scenario for the benefit of the learners (Hooker, 2009).

MOOCs: An online course offered in a flexible learning environment that supports its users without any prerequisites to explore and learn the same material (Downes, 2011).

Under graduate teacher education programme: Two year Bachelor of Education (B.Ed.) programme that prepares professionals for teaching at upper primary, secondary and senior secondary levels (NCTE Regulations, 2014).

Sample and Sampling

Guru Gobind Singh Indraprastha University (GGSIP University), Delhi is a state professional university established by Delhi Government in the year 1998. Education as a professional discipline is offered by the university through Bachelor of Education (B.Ed.) courses in its affiliated institutions. Keeping in view the administrative, academic, time and pandemic constraints, random sampling was exercised in selecting the sample of the study that is ten B.Ed. institutions were selected as the sample of the study. From these ten randomly selected B.Ed. institutions, the research tools were administered on the 39 teacher educators and 198 prospective teachers of Social Science, Science, Mathematics and languages (Hindi and English) subjects.

Tools for Data Collection

Following research tools were used and developed by the investigator for data collection:

- Content analysis was done to explore the available online learning portals for B.Ed. course with respect to access, equity and quality parameters.
- A standardized test by Gupta (2021) was administered on the prospective teachers of B.Ed. institutions to explore their competence level in using technology to promote their professional growth.
- Structured interview of teacher educators of B.Ed. institutions was conducted to assess the criteria adopted in selecting a MOOC for the professional growth of the prospective teachers.
- Structured interview of the prospective teachers of B.Ed. institutions was conducted to gauge their self-concept with respect to technology in promoting their professional growth.

The qualitative research tools developed by the investigator were used for the data collection after establishing their content validity.

Techniques of Data Analysis

Relevant qualitative and quantitative approaches for the data analysis were used for data analysis. Content analysis, as the qualitative approach, a frequency counting, as quantitative approach, were employed for data analysis. So, a mixed research method was employed for data analysis.

Data Analysis:

(i) To explore the available online learning portals for B.Ed. course with respect to free and subscribed access.

In India, SWAYAM is the national platform for MOOCs. At SWAYAM there are nine (9) national coordinators namely

(1) AICTE (All India Council for Technical Education): has been appointed as the 9th National MOOCs Coordinator for the courses that do not fall in the purview of any of the existing national coordinators. The courses offered by AICTE platform are for the university and college teachers of engineering courses.

(2) UGC (University Grants Commission): offers content for 27 postgraduate level courses at SWAYAM in higher education. All these courses have been translated into Hindi, Marathi, Telugu, Malayalam, Tamil, Kannada, Bengali and Gujarati.

(3) CEC (Consortium for Educational Communication): is one of the inter university centres set up by UGC. As national coordinator for MOOCs, CEC offers undergraduate courses in arts, languages, literature, social sciences, natural and applied sciences, management and some professional courses.

(4) IGNOU (Indira Gandhi National Open University): offers MOOCs courses in various disciplines through its Centre for Online Education which is a flexible instructional delivery system. The MOOCs offered are for certificate and diploma level courses.

(5) NIOS (National Institute of Open Schooling): offers 44 courses on SWAYAM out of which 14 courses are at secondary level, 16 courses at senior. secondary level, 4 vocational courses and 10 diploma courses in elementary education.

(6) IIMB (Indian Institute of Management Bangalore): is the first management school in India to offer MOOCs on the edX and offers MOOCs in management education. The supporting partner for SWAYAM courses for the national coordinator IIMB is the Quality Council of India (QCI) which is an autonomous body set up by the Government of India jointly with the Indian Industry represented by Associated Chambers of Commerce and Industry of India, Confederation of Indian Industry and Federation of Indian Chambers of Commerce and Industry. QCI will also provide learner support to IIMB SWAYAM courses and help in dissemination of learner information from time to time.

(7) NCERT (National Council of Educational Research & Training): offers MOOCs in school education (classes IX – XII). At senior secondary level, for 11 courses it is 28 MOOCs for school teachers.

(8) NITTTR (National Institute of Technical Teachers Training and Research): focuses on the quality of engineering education at national level and in the southern states in particular. Its head office is in Chennai. NITTTR aims to foster research in the interdisciplinary area in engineering and offers consultancy and extension services for the growth of technical institutions. NITTTR Chennai offers MOOCs for the teacher training program, along with the other NITTTRs situated at Bhopal, Chandigarh and Kolkata.

(9) NPTEL (National Programmes on Technology Enhanced Learning): as a national initiative was started in the year 2003 by the Government of India with seven Indian Institutes of Technology (Delhi, Bombay, Kharagpur, Kanpur, Madras, Guwahati and Roorkee), as the major stakeholder, and Indian Institute of Science, Bangalore. NPTEL is the largest online repository that offers MOOCs in engineering, basic sciences, selected humanities and social sciences subjects.

NCERT, NIOS, CEC, NITTTR and IGNOU offer MOOCs in teacher education at diploma, undergraduate, postgraduate level. The courses are in the subjects like Educational psychology, Educational Technology, Curriculum and Instruction, Special Education, Early Childhood Education, ICT, Sociology of Education, Communication Technologies, Evaluation and Assessment, Early Childhood Care and Education, Guidance and Counselling, School Organization and Administration, Learning and Teaching, Environmental Studies, Learning Management System- MOODLE, Academic and Research Report Writing, e-content Development, Entrepreneurship Programmes, Pedagogical Courses in the domains of Science Education, Social Science

Education, Mathematics Education and Language Education. The duration of MOOCs may be 4, 6, 8, 12, 16 or 24 weeks with 2, 3 or 4 credit points. The MOOCs may be for core or elective subjects. In the teacher education domain, IGNOU offers MOOCs in Hindi medium also. The MOOCs are free to subscribe but for evaluation, which is through National Testing Agency (NTA), one has to pay the fee. Each course has a self-assessment / evaluation assignment. The assignments may be auto graded or manually evaluated assignments. The auto graded assignments are generally in the form of multiple-choice questions, multiple select questions or fill in the blanks. The manually evaluated assignments may require document upload of essay type questions.

Interpretation: Registration for MOOCs is free but for evaluation the students have to pay the fee. So, the students enrolled in the formal education system, like in university or teacher education institutions, have to pay at their institutional level as well as registration fee for the evaluation component of MOOCs. This financially burdens the students.

(ii) To explore the available online learning portals for B.Ed. course with respect to equity.

The multi-lingual and non-English MOOCs facilitate diverse regional learners with low levels of their previous education. Out of the nine national co-ordinates for MOOCs at SWAYAM, only IGNOU offers exclusive MOOCs in languages other than English. The MOOCs offered through IGNOU in teacher education are in Hindi medium for the subjects like Educational Management, Basic Ideas in Education, Sustainable Development, Pedagogy of Mathematics. The courses are at undergraduate and postgraduate level of 16 weeks duration with 4 or 6 credits. So, these MOOCs suit the non-English speaking students or professionals. The self-assessment component of these MOOCs supports the students or professionals who are enrolling for any MOOCs for the first time.

Interpretation: There is a dire need to launch MOOCs through different national coordinators at SWAYAM for teacher education in languages other than Hindi.

(iii) To explore the available online learning portals for B.Ed. course with respect to quality content.

EdX, FutureLearn and Coursera, are some other available online portals offering MOOCs for teacher education.

-EdX: offers MOOCs in computer science, Business Management, Artificial Intelligence, Data Analysis and Statistics, Engineering, Economics and Finance, Communication, Humanities, Mathematics, Social sciences, Language, Biology and Life-Sciences, Medicine, Education & Teacher Training, Environmental Studies, Electronics, Architecture, Physics. It is not for profit platform established by Harvard and MIT. The duration of courses is of 6 months with 2-3 hours work per week.

Future Learn: is a British digital education platform that was founded in the year 2012 and offers MOOCs in Teaching, Nature & Environment, Creative Arts & Media, Business Management, Politics & Society, Literature, Healthcare & Medicine, Law, History, Science, Engineering & Maths etc.

Coursera: is a global online learning platform that provides access to online courses and degrees from the leading universities and companies. The courses are of less than 2 hours duration, 1-4 weeks, 1-3 months or 3-6 months. Each course is offered at beginner, intermediate, advanced or mixed level. The courses are offered in subjects like health, law, business, math & logic, language training, personal development, teaching, social science, physical science & engineering.

Interpretation: There are a number of online portals for MOOCs which meet quality criteria with respect to course outline, assignments, duration and evaluation. But the duration of MOOCs at some online portals is too long, up to 6 months so these courses have low strength of registered users.

(iv) To explore the competence level of prospective teachers in using technology to promote their professional growth.

The educational test for exploring the competence level of prospective teachers in using technology to promote their professional growth was administered by the investigator on the randomly selected sample that is 198 prospective teachers. Table 1 shows the corresponding statistics after data analysis:

Table 1 Competence level of prospective teachers in using technology for professional growth			
	N	Mean (M)	S.D. (6)
High Level	39 (19.69%)	84.28	7.89
Moderate Level	123 (62.12%)		
Low Level	36 (18.18%)		
Total	198		

The obtained mean value (M) is 84.28 and standard deviation (6) is 7.89. The inferential statistics shows that $M \pm 6$ range marks the competence level of prospective teachers in using technology to promote their professional growth. The range of $M \pm 6$ is 92.17 – 76.39 that means the prospective teachers beyond score 92.17 will have high level of competence in using technology for their professional growth. Prospective teachers with score between 92.17 – 76.39 will have a moderate level of competence in using technology for their professional growth and prospective teachers with scores below 76.39 will have low level of competence in using technology for their professional growth.

So, table 1 shows that there are 39 prospective teachers (19.69%) having a high level of competence in using technology for their professional growth, 123 prospective teachers (62.12%) have a moderate level of competence in using technology for their professional growth. and 36 teacher educators (18.18%) have a low level of competence in using technology for their professional growth.

Interpretation: Majority of the prospective teachers had a moderate level of competence in using technology for their professional growth. The plausible reason for this might be inadequate or lack of training, on the part of the prospective teachers, in using technology before joining the undergraduate teacher education courses.

(v) To study the criteria adopted by B.Ed. institutions in selecting a MOOC for the professional growth of prospective teachers.

Data Analysis: To study the criteria adopted by B.Ed. institutions in selecting a MOOC for the professional growth of prospective teachers a structured interview was conducted. The content analysis of the responses of teacher educators was done. It was found that 73% of respondents opined that engaging quality content, sequencing of the modules, objective assessment and evaluation, clear guidelines and timeline with manageable tasks to be completed, and feedback are some of the criteria that must be taken care of before

selecting a MOOC for prospective teachers. 18 % respondents asserted that duration of a MOOC is one of the important criteria which should be given highest priority as the course duration ranges from 4 to 24 weeks. 9% respondents were of the view that a MOOC should be mobile friendly, that is the platform is suitable for mobile devices and a user can access it as per convenience.

Interpretation: Engaging and interactive academic content, precise presentation of course objectives, assessment, feedback etc. are some of the significant criteria which a B.Ed. institution should consider deciding and selecting a MOOC for the professional growth of prospective teachers.

(vi) To gauge the self-concept of the prospective teachers with respect to technology in promoting their professional growth.

Data Analysis: A structured interview was conducted to explore the self-concept of the prospective teachers with respect to technology in promoting their professional growth. The content analysis of the responses of prospective teachers was done. It was found that 39% of respondents had low self- confidence in using ICT resources. 23% of respondents had comfort in using the internet and other technology devices. Rest of the 38% respondents always relied on getting online or offline training prior to using any technology resource.

Interpretation: The different views expressed by the prospective teachers show that they needed training for using technology otherwise it may lead to a low self-confidence among them for ICT and technology associated devices for their professional growth.

(iv) Project outcome

The project outcomes of this study are reflected as the educational implications for the following stakeholders:

Educational Implications for prospective teachers: The prospective teachers must have elementary knowledge about technology and its usage. They should enrol themselves in a MOOC which is not offered through any core or elective papers as it may lead to their significant professional development.

Educational Implications for teacher educators: The teacher educators should themselves be well versed in using technology so that if any prospective teacher faces some difficulty in completing the MOOC, then instant support may be provided to them rather than reporting to the MOOC developer. The teacher educators should keep themselves updated with respect to the title, objective, national coordinator, evaluation aspects etc. so that with immediate start of semester, the prospective teachers may enrol without any delay.

Educational Implications for curriculum planners: The curriculum planners of undergraduate teacher education programmes should frame the curriculum keeping in mind that MOOCs are the paid courses. So, its leads to a financial burden on prospective teachers. Besides this, MOOCs are offered by a national coordinator but its evaluative phase pertains to some other agency that is NTA so, a coordination between the concerned national co-ordinator and NTA is essential so that prospective teachers may not suffer any academic loss. Many times, results get delayed at the end of NTA and it leads to postponement of their final result or even degree.

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Challenges Encountered in Designing Intervention Materials in the New Learning Modality of Adlay National High School, Division of Surigao del Sur

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Abstract

This study aimed to examine the challenges encountered in designing intervention material in the new learning modality of Adlay National High School, Division of Surigao del Sur.

The Demographic Profile of the respondents were tracked and the challenges being considered were: formative assessment tracking, summative assessment tracking, performance assessment tracking, design of the intervention material, and authenticity of intervention materials.

A validated questionnaire was distributed to 33 teachers in Adlay National High School and they were the respondents of the study. Data gathered were analyzed using Percentage and Weighted Mean.

The study reveals that the major challenge in designing intervention materials in the new learning modality is in Formative Assessment Tracking and Performance Assessment Tracking since the survey revealed a weighted mean of 4.47. Specifically, *“The least-learned competency/ies are remedied through intervention materials”* (indicator #3 in Formative Assessment Tracking) and in *“Intervention Materials for performance gaps are designed”* (indicator #2 in Performance Assessment Tracking) since the survey revealed a mean score of 4.18 with the description of *“Many Times”* for both indicators. The findings imply that there is a need to identify the least-learned competency/ies right after the formative assessment and it should be remedied immediately by the corresponding intervention materials by the subject teacher. The result also implies that the teacher should have enhancement training in designing appropriate intervention materials for performance gaps of the learners.

Key Words: Adlay NHS, Challenges, Design, Intervention Materials, New Learning Modality

Definition of Terms

The following are the terms used in the study:

Assessment: Refers to the wide variety of methods or tools that educators use to evaluate, measure, and document the academic readiness, learning progress, skill acquisition, or educational needs of students.

Challenges: To come upon or meet with, especially unexpectedly: to encounter a new situation to meet with or contend against (difficulties, opposition, etc.).

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Competencies: Inherent qualities an individual possesses – combining skills, knowledge, and ability.

Learning modalities: The sensory channels or pathways through which individuals give, receive, and store information.

Intervention materials: Refers to a teaching aid introduced into the teaching methods to stimulate the activity of the students and thereby increase their level of understanding.

Introduction & Rationale

Intervention material in the new learning modality plays a very important role in the teaching-learning process. It enhances the memory level of the students and makes the teaching – learning process more meaningful and interesting (Nicholls, 2000; Raw, 2003). In the context of Philippine education system, intervention materials are highly regarded as tools for remediating poor achievements of the learners especially in these trying times where the advent of the current COVID-19 pandemic almost halted the education process between teachers and students. Intervention material for remediation purposes is one of the solutions employed by the Department of Education to enhance academic achievements of students performing low in different fields.

Intervention Material refers to a teaching aid introduced into the teaching methods to stimulate the activity of the students and thereby increased their level of understanding (Dy, 2011). It is strategically prepared and designed for teaching remediation for low achievers in the subject. It is given after the regular classroom instruction to students who were not able to grasp the concepts of the subject matter (Salviejo, et al., 2014). Bunagan (2012) defined Intervention Material as meant to re-teach the least-learned concepts and skills. It is a material given to students to help them master competency – based skills which they were not able to develop during a regular classroom teaching. It consists of both learning strategies (for students) and content enhancement (for teachers).

As the consequence of the lockdowns, schools have been temporarily closed. The COVID-19 school closures have a negative impact on students' knowledge and skills development. On the division tracking of the *Report on Learning Assessment* for the Second Quarter of S.Y. 2020-2021 with regards to the new learning modality, it is evident in the results from Junior High School (Grade 7 to Grade 10) of Adlay National High School that there are 21 total number of students belongs to “Nearly Proficient” level. Out of these number, 21 students at Junior High School obtained failing grades due to low performance based on their preferred print modular distance learning. This problem in education is now being addressed in line with DepEd Memorandum No. 117, series of 2005, provided the teachers the training and workshop on how to prepare this intervention material. Also, this study adheres on the DepED Caraga Regional Memorandum No. 161, s. 2021 also known as “Needs Assessment for Intervention Programs for Learners at Risk of Dropping-Out and Learners with Failing Grades.” However, there are many challenges in designing intervention material in the new learning modality.

With this, the researchers sought to find the challenges in designing intervention material in the new learning modality of Adlay National High School, Division of Surigao del Sur. The results of this study aimed to enhance the use of intervention material in the new learning modality and opens the lens of opportunities to

the learners to learn, to enjoy, and to significantly absorb the K to 12 Basic Education Program particularly the Most Essential Learning Competencies (MELCs) provided.

Literature Review

At the beginning of the pandemic in March 2020, the government locked all the education centers down in Philippines and declared for distance education. As effective teachers in a New Normal mode of learning, he or she should consider learning new techniques and ways to give their students more exciting activities and conduct interventions to those who are at risk of dropping out and has a failing grades in different areas (De Vera, 2020).

Intervention materials are teaching-learning kits devised for the benefit of both teachers and students. Its goals are to encourage learner's interest; learn concepts and skills; and apply learned skills and concepts into real life situations. Intervention Material is believed to be an effective teaching aid for teachers in carrying out objectives on least learned lessons (Bayucca, 2020).

Intervention materials are conceptualized and designed to aid the teacher provide the learners the needed support to make progress in studies. These will increase and deepen the skills, knowledge and understanding of the child in various subject areas in the curriculum. Instructional Materials can give an opportunity to explore various ideas and concepts that would enrich their understanding of varied subject matters that sharpen their competencies. Furthermore, the intervention materials tend to reteach the lessons which are not so much clear to the learners and to help them gain mastery of the skills. However, there are many challenges in designing intervention materials. The teacher should always consider and guarantee alignment of activities with the task and objectives, keep the activities short and simple, provide a variety of activities to cater to the diverse learners and provide number of activities so that the learner can have enough practice in developing the skill and focus on the least mastered skills (Rodrigo, 2018).

In addition, the designs of intervention materials are attractive and eye-catching that is why a lot of teachers are encouraged to use them in the teaching-learning process. The benefit of the strategic intervention materials is not only for the teacher's convenience and system in teacher but also for the easy grasp of the learners (Rodrigo, 2018).

DepED Caraga issued Regional Memorandum No. 161, s. 2021 also known as "Needs Assessment for Intervention Programs for Learners at Risk of Dropping-Out and Learners with Failing Grades."

From January 4 to February 27, 2021, quarter 2 was conducted to all schools mandated by Memorandum OUCI-2020-307 of the Department of Education and the identified learners of Adlay National High School was given intervention every after the weekly tracking of results of their answers on the LASs and summative tests given.

Research Questions

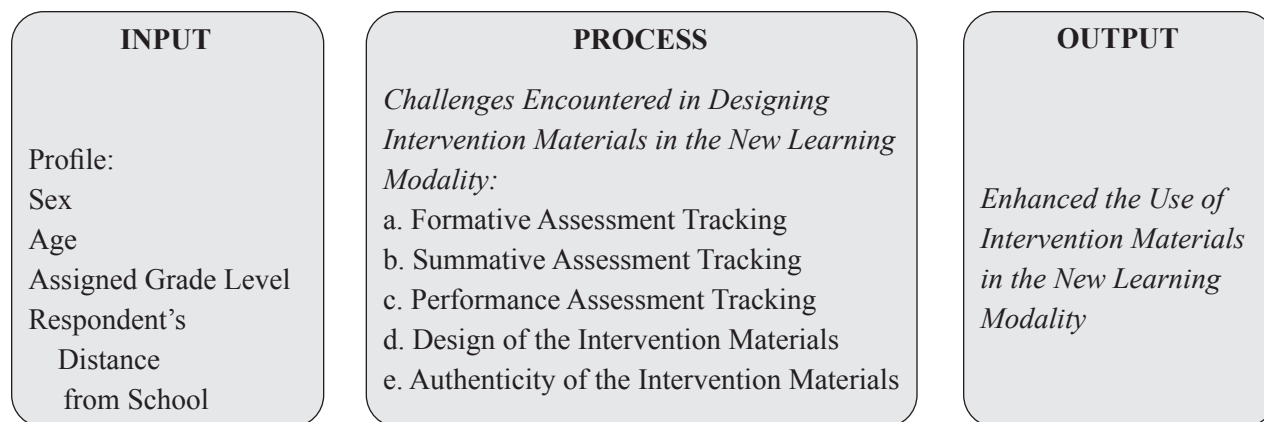
Statement of the Problem:

This study delved on the challenges encountered of teachers in designing of intervention materials in the new learning modality of Adlay National High School, Division of Surigao del Sur.

Considering the research problem, the following questions are posed:

1. What is the profile of the teacher respondent in terms of:
 - a. Sex
 - b. Age
 - c. Assigned Grade Level
 - d. Respondent's Distance from School
2. What are the challenges encountered in designing of Intervention Materials in the New Learning Modality of the teacher respondent as to:
 - a. Formative Assessment Tracking
 - b. Summative Assessment Tracking
 - c. Performance Assessment Tracking
 - d. Design of the Intervention Materials
 - e. Authenticity of the Intervention Materials
3. What measures are recommended to enhance the use of intervention materials in the new learning modality?

Schematic Diagram



Scope and Limitation

The study examined the challenges encountered by the teachers in designing intervention materials in the new learning modality of Adlay National High School, Division of Surigao del Sur, Philippines. The researchers sought to find out such challenges to give interventions for improvement to enhance the use of intervention materials in the new learning modality. Specifically, the study determined the challenges encountered on formative assessment tracking; summative assessment tracking; performance assessment tracking; design of the intervention material; and authenticity of intervention materials.

Findings were based on the results from the questionnaire given to the thirty-three (33) respondents who served as sample. Respondents were the teachers of Adlay National High School from Grade 7 to Grade 12. Results were used to come up with solutions to enhance the use of intervention material in the new learning modality of Adlay National High School, Division of Surigao del Sur.

Research Methodology

A. Sampling

This study used a descriptive quantitative research design. The population of the study consisted of teachers in Adlay National High School. Data were obtained through *Complete enumeration* where in all the thirty-three (33) teachers are considered as the respondents.

B. Data Collection

A questionnaire written in English was designed to capture data on the following variables: Demographic Profile and The Challenges in Designing Intervention Materials in the New Learning Modality. These variables mainly comprised the validated questionnaire. A total of 21 questions were formulated to capture information on all the variables. Each statement on the questionnaire was based on the Likert Scale, and each answer was assigned weights to establish normally distributed scores. The weights of the responses from the questionnaire were assigned as follows:

1. Refers to “Never”
2. Refers to “Seldom”
3. Refers to “Sometimes”
4. Refers to “Many Times”
5. Refers to “Always”

After identifying the ideal number of samples which is *complete enumeration* of the teachers in Adlay National High School, the survey questionnaire was given to each respondent. The researchers floated the questionnaire. The questionnaire was available for one week to allow the respondents sufficient time to completely answer the questions. Survey forms were then collected and recorded for further interpretation and analysis. To observe intellectual property rights, all data gathered were subjected to utmost confidentiality.

Discussion of Results

This part deals with the presentation, analysis, and interpretation of the data.

Findings

Profile of the teacher respondent in terms of: Sex, Age, Assigned Grade Level and Respondent’s Distance from School

Table 1 Demographic Profile of Respondents

A. As to their Sex	FREQUENCY	PERCENTAGE
Male	11	33.33 %
Female	22	66.67%
B. As to their Age		
20-29	14	42.42 %
30-39	16	48.49 %
40-49	2	6.06 %
50 ABOVE	1	3.03 %
C. As to their Assigned Grade Level		
Grade 7	7	21.21%
Grade 8	5	15.15%
Grade 9	7	21.21%
Grade 10	6	18.19%
Grade 11	5	15.15%
Grade 12	3	9.09%
D. Distance from School		
0-10 km	18	54.55 %
11-20 km	10	30.30 %
21-30 km	3	9.09 %
31-40 km	1	3.03 %
41 – 50 km	1	3.03 %
50 km – above	0	0

As shown in table 1, the greatest number of respondents were females which represent the **66.67%** while the males represent the **33.33%** of the respondents. The 30-39 age group has the greatest number of respondents with **48.48%**. Most of the respondents were assigned or have subject taught in Grade 8 with **24.24 %**. Most of the respondents (**54.55%**) live 0-10 km away from the school they are teaching. There were respondents (**30.30%**) who traveled 11-20km from home to the school they were assigned.

The results were looked at for the percentage of respondents' sex, age, assigned grade level and distance from school and its impact on designing intervention materials in the new learning modality of Adlay National High School – Division of Surigao del Sur.

Tracking of demographic information allows you to better understand certain background characteristics of the respondents, whether it's their sex, age, work situation, address, marital status, etc. (Bersabal, 2000).

Challenges encountered in designing of Intervention Materials in the New Learning Modality of the teacher respondent as to: Formative Assessment Tracking, Summative Assessment Tracking, Performance Assessment Tracking, Design of the Intervention Materials and Authenticity of the Intervention Materials.

Table 2 Challenges Encountered by the respondents in designing of Intervention Materials in the New Learning Modality		
A. Formative Assessment Tracking		
Indicators	Mean	Description
1. The weekly competencies are tracked.	4.60	Always
2. The least-learned competency/ies are identified.	4.50	Always
3. The least-learned competency/ies are remedied through intervention materials.	4.18	Many Times
4. The intervention materials for formative assessment undergo Quality Assurance.	4.60	Always
Weighted Mean	4.47	Always
B. Summative Assessment Tracking		
Indicators	Mean	Description
1. The competencies needed for summative competencies are tracked.	4.88	Always
2. The least-learned competency/ies are identified.	4.73	Always
3. The least-learned competency/ies are remedied through intervention materials.	4.27	Always
4. The intervention materials for summative assessment undergo Quality Assurance.	4.64	Always
Weighted Mean	4.63	Always
C. Performance Assessment Tracking		
Indicators	Mean	Description
1. The Theme-Based Authentic Performance Assessment (TBAPA) is tracked.	4.82	Always
2. Performance gaps are identified.	4.52	Always
3. Intervention Materials for performance gaps are designed.	4.18	Many Times
4. Intervention Materials for performance gaps undergo Quality Assurance.	4.42	Always
5. Intervention Materials for performance gaps are administered.	4.39	Always
Weighted Mean	4.47	Always

Table 2 Challenges Encountered by the respondents in designing of Intervention Materials in the New Learning Modality—cont'd		
D. Designing of the Intervention Materials		
Indicators	Mean	Description
1. Teachers are trained to design intervention materials.	4.35	Always
2. Teachers are given technical assistance (when needed) as they design intervention materials.	4.55	Always
3. Intervention materials are designed suited to the needs of the learner.	4.42	Always
4. Intervention materials undergo Quality Assurance.	4.61	Always
Weighted Mean	4.48	Always
E. Authenticity of the Intervention Materials		
Indicators	Mean	Description
1. The intervention materials are suited to the cognitive dimensions of the learners.	4.54	Always
2. The intervention materials cater to the diverse learning needs.	4.48	Always
3. The intervention materials are anchored on the Most Essential Learning Competencies (MELC).	4.79	Always
4. The intervention materials are easy to handle/answer/perform.	4.73	Always
Weighted Mean	4.46	Always
Gen. Weighted Mean	4.50	Always

Table 2 shows the challenges encountered by the respondents in designing intervention materials in the new learning modality. As to formative assessment tracking, it has a weighted mean of **4.47**. Out of the four indicators, summative assessment tracking has a weighted mean of **4.63**. Performance assessment tracking also has a weighted mean of **4.47**. For designing of intervention materials and authenticity of intervention materials, **4.48** and **4.56** were computed. All these challenges would fall under “*Always*” description. Based on these five identified challenges, a general weighted mean of **4.50** was computed with a general description of “*Always*”.

Based on the table above, Formative Assessment Tracking and Performance Assessment Tracking got the lowest weighted mean which is **4.47**. Specifically, “*The least-learned competency/ies are remedied through intervention materials*” (indicator #3 in Formative Assessment Tracking) and in “*Intervention Materials for performance gaps are designed*” (indicator #2 in Performance Assessment Tracking) since the survey revealed a mean score of **4.18** with the description of “*Many Times*” for both indicators.

The findings implied that there is a need to identify the least-learned competency/ies right after the formative assessment and it should be remedied immediately by the corresponding intervention materials by the subject teacher. Magno (2017) mentions Formative Assessment need not be graded as summative assessments (end-of-unit exams or quarterlies, for example). It serves as practice for students. Tracking of the result in formative

assessments will check for understanding along the way and identify those least-learned competencies and guide teacher decision making about future instruction. Rodrigo (2018) added that Intervention materials are conceptualized and designed to aid the teacher provide the learners the needed support to make progress in studies. These will increase and deepen the skills, knowledge and understanding of the child in various subject areas in the curriculum. Instructional Materials can give an opportunity to explore various ideas and concepts that would enrich their understanding of varied subject matters that sharpen their competencies. Furthermore, the intervention materials tend to reteach the lessons which are not so much clear to the learners and to help them gain mastery of the skills.

The result also implied that the teacher should have enhancement training in designing appropriate intervention materials for performance gaps of the learners. This is in line with Division memo No. 031, s. 2021 in Surigao del Sur also known as Roll-out and Designing Theme-Based Authentic Performance and Assessment (TBPA) Materials to 35 Districts for Second Quarter instructs the field to allow the select teachers to be trained for TBAPA so that the schools will utilize the learning packets to be designed by the developers. Rodrigo (2018) also cited that the teacher should always consider and guarantee alignment of activities with the task and objectives, keep the activities short and simple, provide a variety of activities to cater to the diverse learners and provide number of activities so that the learner can have enough practice in developing the skill and focus on the least mastered skills.

What measures are recommended to enhance the use of intervention materials in the new learning modality?

To enhance the use of intervention materials in the new learning modality of Adlay National High School, Division of Surigao del Sur, the following measures are recommended:

1. Conduct INSET/LAC Sessions for teachers on designing intervention materials”.
2. Conduct School Learning Action Cell (SLAC) to enhance teacher capacity in identifying least-learned competency/ies from Formative to summative assessment using E-tool to design appropriate intervention materials.

Conclusions

The study reveals that the major challenge in designing intervention materials in the new learning modality is in Formative Assessment Tracking and Performance Assessment Tracking since the survey revealed a weighted mean of 4.47. Specifically, “*The least-learned competency/ies are remedied through intervention materials*” (indicator #3 in Formative Assessment Tracking) and in “*Intervention Materials for performance gaps are designed*” (indicator #2 in Performance Assessment Tracking) since the survey revealed a mean score of 4.18 with the description of “*Many Times*” for both indicators.

The findings implied that there is a need to identify the least-learned competency/ies right after the formative assessment and it should be remedied immediately by the corresponding intervention materials by the subject teacher.

The result also implied that the teacher should have enhancement training in designing appropriate intervention materials for performance gaps of the learners.

Recommendations

1. It is recommended that least-learned-competency/ies must be identified right after the formative assessment and it should be remedied immediately by the corresponding intervention materials by the subject teacher.
2. It is also recommended that the teacher should have enhancement training in designing appropriate intervention materials for performance gaps of the learners.
3. It is further recommended also to conduct a study on the Effectiveness of Intervention Materials in the New Learning Modality and to determine the correlation or the significant relationship of the demographic profile and challenges encountered in designing of intervention materials.

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Towards Discovering the Best Learning Strategy in Developing Student's Problem-Solving Skills in Mathematics

Camus, Karine Jane Belleza

Abstract

Problem-solving skill is one of the most important competencies that should be developed to strengthen the students' analytical and critical thinking skills in applying mathematics to real-world situations. This study aimed to develop an instructional intervention to improve the problem-solving skill of the students in mathematics. The discussions of the study followed the Analysis, Design, and Development (ADD) Phases. In the analysis phase, the problem-solving skill of the students was determined using their pretest scores. In the design phase, based on the initial performance of the students, lesson exemplars were crafted and utilized integrating the learning strategies in terms of real-world experiences, visual representations, and learning socially in groups. In the development phase, after the conduct of the lesson using the exemplars, posttest was administered to determine if there is a significant improvement using the learning strategies. The best learning strategy was incorporated in the modular skill enhancement strategy as an instructional intervention which was developed in this study. Descriptive and comparative methods of research were utilized. Forty Grade 11 students under Humanities and Social Sciences Strand of Camarines Sur National High School were chosen through purposive random sampling. Statistical tools such as mean, rank, and paired sample t-test were utilized. Based on the findings, students were advanced beginners ($M=2.38$) in solving word problems in the administered pretest. To address the issues and gaps in problem-solving skill of the students in math, lesson exemplars were made applying the 4A's Model of Jane Vella (2008). After the delivery of instructions using the lesson exemplars, posttest was administered. Comparing the results from the pretest, the student's performance in solving word problems improved. They were found to be competent ($M=4.61$). This study concluded that there are two learning strategies that can develop the problem-solving skills of the students. These are learning through real-world experiences and visual representations. To enhance the students' performance in problem-solving, the suggestions and recommendations were: (1) a compendium of lesson exemplars integrating the learning strategies in terms of real-world experiences and visual representations can be developed; (2) Math Enhancement Program can be proposed by the teachers to improve the students' performance in math; and further investigations can be conducted to assess the factors behind the poor performance of the students. This is possible by assessing their demographic background, learning styles, and interests.

Key Words: Problem-solving Skill, Real-World Experience, Visual Representation, Learning Socially in Groups, Lesson Exemplar, Modular Skill Enhancement Strategy

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Introduction

Mathematics increases its influence on all facets of human life because it is mainly the foundation of the scientific and technological knowledge needed by the people living in the modern era. As people become increasingly dependent to computers, worldwide communication, and global markets, learning mathematics becomes a key to all job opportunities. Such jobs require preparation in constructing new ideas, perceiving patterns, and solving problems. Indeed, it is a must to prepare and motivate the 21st century students to be competitive and skilled to face the future industry and success through providing them opportunities which will enhance their inner talents and skills for effective participation in everyday living. As mentioned by the new curriculum, this necessitates stronger development of mathematical skills, abilities, and values of the students.

Problem-solving skill is one of the most important competencies that should be developed to strengthen the students' analytical and critical thinking skills, especially the sense of solving problems of the students in applying mathematics to real-world situations. According to Moschkovich and Zahner (2018), the common difficulties students face while learning mathematics include lack of confidence when solving problems, weakness in understanding terms and mathematical language, confusion when determining mathematical operations, and lack of conceptual and procedural skills. Additionally, Tambychika and Meerah (2017) emphasized that lack of proficiency with number facts, weakness in computation, lack of ability to connect mathematical concepts, inability to transfer knowledge, lack of ability to make meaningful connections between information, inability to transform information mathematically, lack of proficiency with mathematical terms, lack of proficiency with mathematical language, and difficulty understanding and visualizing mathematical concepts might cause mistakes and confusion when carrying out mathematical tasks. These are the prerequisites that should be practiced improving the level of proficiency of the students in problem-solving.

With this growing concern in learning mathematics, it is evidently shown from the summarized report on the learning progress and achievement of the students issued by the senior high school math teachers of Camarines Sur National High School, for the first semester, school year 2022 – 2023, 24.58% or 438 out of 1,782 students got 90% and above with an outstanding performance, 25.03% or 446 out of 1,782 students got 85% - 89% with a very satisfactory performance, 31.14% or 555 out of 1,782 students got 80% - 84% with a satisfactory performance, 18.46% or 329 out of 1,782 students got 75% - 79% with a fairly satisfactory performance, and 0.79% or 14 out of 1,782 students got 74% and below who did not meet the expectations. Based on this data, it can be noted that 80% - 84% has the percentage which will explain that the students have met the minimum requirements. Students were content with just passing the subject without a line of 7 grade.

In the year-end report of the Department of Education (2019), it highlighted the low performance of Filipino learners in the National Achievement Test (NAT) that was administered in school year 2018-2019, specifically in Science, Math, and English. The Overall Mean Percentage Score (MPS) for Grades 6, 10, and 12 was 37.01%. Highlighting the over-all 21st Century Skills MPS in problem-solving skills in mathematics was 34.82% which is far below the passing percentage of 75%. Moreover, Magsambol (2020) revealed in his article that the Philippines scored significantly lower in participating in The Trends in International Mathematics and Science global assessment among 58 countries. This is evident to show that when it comes to learning mathematics, they show poor progress as well as proficiency in problem-solving skill.

There are many factors that can be considered in developing the level of problem-solving skill of the students. Ukobizaba et al. (2021) confirmed that this includes the learning strategy and evaluation techniques which

can help improve students' acquisition of mathematical problem-solving abilities. Hogbin (2020) discussed in his article that there are efficient teaching techniques for improving students' ability to solve mathematical problems. He began by pointing out that pupils can better understand how an abstract notion relates to a physical situation when visual representations are used. To motivate pupils to solve math problems visually, the teacher can offer illustrated problems or hands-on activities. By developing the brain's neural networks, several perspectives on a subject can improve knowledge and memory. Second, a key component of studying mathematics is to concentrate on actual problem-solving and thinking. Outside the classroom mathematics occurs in a complex form of problems rather than simple questions with a single correct solution. Because of this, the best training gives learners the thinking and problem-solving abilities they will need in the actual world. Instructors might not always be clear about what pupils must do. Students must experiment with various methods before choosing one that is effective. Finally, through sharing ideas with others, students are exposed to a variety of mathematical perspectives that they can utilize to think more creatively. It helps students articulate their mathematical ideas, which improves their clarity of thought and self-awareness of their own approaches to problem-solving. It reflects how mathematics is practiced outside of the classroom, when teams of individuals with varying skill sets collaborate to address difficult problems from the real world. Additionally, as cited by John Bransford of the University of Washington Professor of Education and Psychology, in his book *How People Learn* (1999), the following characteristics are part of how we naturally learn: real-world learning, intrinsic motivation, mental and virtual model-building, multiple pathways to expertise, and learning socially in groups and teams.

To solve the issues and gaps concerning the level of problem-solving skills of the students, this study assessed the best learning strategy in improving the problem-solving skills of the students to be integrated in developing the modular skill enhancement strategy as an instructional intervention.

Framework

The conceptual framework in figure 1 shows the Analysis, Design, and Development (ADD) Phases. In the analysis phase, the problem-solving skill of the students was determined using their pretest scores. In the design phase, based on the initial performance of the students, lesson exemplars were crafted and utilized integrating the learning strategies in terms of real-world experiences, visual representations, and learning socially in groups. In the development phase, after the conduct of the lesson using the exemplars, posttest was administered to determine if there is a significant improvement using the learning strategies. The best learning strategy was incorporated in the modular skill enhancement strategy as an instructional intervention which was developed in this study.

The first theory which was used in the study is Dreyfus Model of Skill Acquisition. It was proposed by Brothers Stuart and Hubert Dreyfus in 1980. The main role of this theory in the study was to assess the level of problem-solving skills of the students based on their performance in the teacher-made tests such as pretest, posttest and the evaluations in each lesson exemplar that were administered.

The second theory was Experiential Learning Theory. It was proposed by David Kolb in 1999. The concept of this theory was applied in the current study since it includes learning strategy based on the real-world experiences of the students in developing their problem-solving skills.

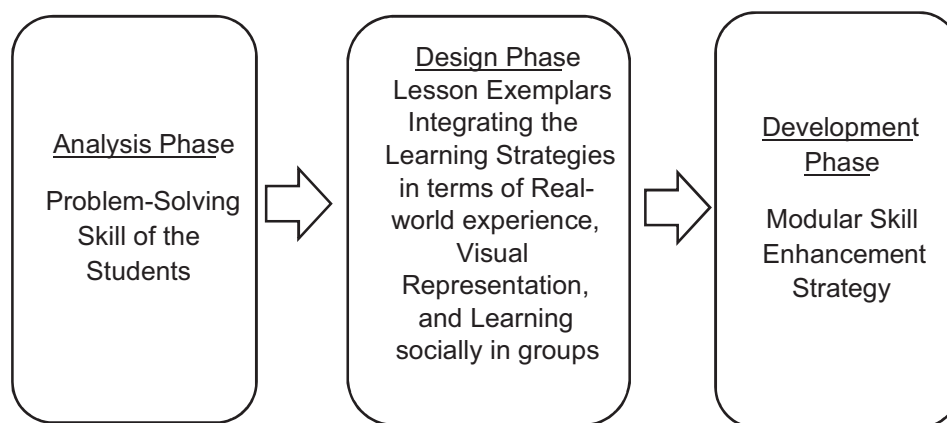


Figure 1. Conceptual Framework

The third theory which was used in the study is the VARK Model Theory. It was developed by Neil Fleming in 1987. This was related to the current study because this used as one of the strategies in learning math which was the focus of this theory. That is using visual representation to improve the problem-solving skill of the students.

The last theory which was incorporated in the current study is the Cooperative Learning Theory. It was proposed by Johnson and Johnson in 1990s. It is a teaching method in which small groups of students collaborate on a single assignment. Students can collaborate on a wide range of tasks, from straightforward math exercises to substantial assignments. It helps students develop their higher order thinking skills, communication skills, and self-management and leadership skills. Students also can build upon their leadership and organizational skills. From this idea, this was adapted in enhancing the students' problem-solving skill as one of the learning strategies.

Objectives of the Study

This study aimed to develop an instructional intervention to improve the problem-solving skill of the students in mathematics.

Materials and Methods

Quantitative research design was used in this study. Specifically, descriptive research method was utilized to determine the level of problem-solving skill of the students considering the pretest results. Also, comparative research method was used to compare the pretest and posttest results. The effects of the facilitation of the lesson exemplars integrating the learning strategies in terms of real-world experience, visual representation, and learning socially in groups were identified to determine the best learning strategy that can help in developing a modular skill enhancement strategy. There were forty (40) respondents that were chosen using purposive random sampling technique. These were Grade 11 students under Humanities and Social Sciences Strand of Camarines Sur National High School.

Teacher-Made Tests and Lesson Exemplars

Teacher-made tests were utilized in this study. These were the pretest and posttest that were used to determine the problem-solving skill of the students using the level of proficiency in terms of Expert, Proficient, Competent, Advanced Beginner, and Novice. Before formulating pretest questions, table of specifications was constructed, that contains the learning competencies of Chapter 1 topics from the curriculum guide of Statistics and Probability, with the corresponding allotted teaching time and number of items. The placement of each question is based on the level of objectives in the Bloom's Taxonomy which are simplified as Knowledge, Understanding and Doing (KUD). All the items in posttest were formulated parallel to the pretest questions. Based on the results of pretest, lesson exemplars were crafted following the 4A's Model Framework by Jane Vella (2008). In each lesson, one learning strategy was incorporated. These strategies are in terms of real-world experiences, visual representations, and learning socially in groups. The teacher-made tests and lesson exemplars were validated by the head teacher, and two master teachers in mathematics department of Camarines Sur National High School using the modified level of acceptability in lesson planning. All the lesson exemplars are rated as highly accepted following the criteria.

Results and Discussion

A. Analysis Phase

The problem-solving skill of the students was determined using the pretest scores. Pretest was administered incorporating the learning competencies in Statistics and Probability.

Table 2 Student's Problem-Solving Skill Based on Pretest Scores			
Learning Competencies	Mean Score	Rank	Level of Proficiency
1. Illustrates a random variable (discrete and continuous). M11/12SP-IIIa-1	2.53	1	Advanced Beginner
2. Distinguishes between a discrete and a continuous random variable. M11/12SP-IIIa-2			
3. Finds the possible values of a random variable. M11/12SP-IIIa-3			
4. Illustrates a probability distribution for a discrete random variable and its properties. M11/12SP-IIIa-4	2.48	2	Advanced Beginner
5. Constructs the probability mass function of a discrete random variable and its corresponding histogram. M11/12SP-IIIa-5			
6. Computes probabilities corresponding to a given random variable. M11/12SP-IIIa-6			

(Continued)

Table 2 Student's Problem-Solving Skill Based on Pretest Scores—cont'd

7. Illustrates the mean and variance of a discrete random variable. M11/12SP-IIIb-1	2.15	3	Advanced Beginner
8. Calculates the mean and the variance of a discrete random variable. M11/12SP-IIIb-2			
9. Interprets the mean and the variance of a discrete random variable. M11/12SP-IIIb-3			
10. Solves problems involving mean and variance of probability distributions. M11/12SP-IIIb-4			
Overall Mean Score	2.38		Advanced Beginner

Pretest Results. As presented in Table 2, the findings reveal that the students were advanced beginners ($M=2.38$) in problem-solving.

Legend

Score		Level of Proficiency
6.41 - 8.00	=	Expert
4.81 - 6.40	=	Proficient
3.21 - 4.80	=	Competent
1.61 - 3.20	=	Advanced Beginner
0.00 - 1.60	=	Novice

It can be inferred that students were advanced beginners without receiving any instruction and learning processes in each learning competency. It may be because of the following reasons. First, students were not yet ready on face-to-face learning activities because of pandemic that impacted their performance in mathematics. They still struggle because they did not master the basic concepts, for years of virtual learning without teacher that will guide them in each step of getting the solution and answer. These concepts are prerequisites. Second, some of the questions are not familiar to them especially the mathematical language or terms which are not used every day. It contains variables, diagrams and graphs which are confusing because they do not know its meaning and use in each question. Third, some of the questions are categorized as part of higher levels of educational learning objectives. These questions intend for the students to use information in new situations, draw connections among the ideas given in each item and make real-life decisions which they cannot make because they need to initially understand the basic concepts which are on the first level of learning. Fourth, students lack willingness to solve the problem because it requires steps to follow before arriving at the correct answer. They did not spend time in computing those because they are too lazy to do the required procedure instead, they chose any of the given options.

The studies of Kuhfeld, M. et al. (2022), Tyaningsih, R.Y. et al. (2021), Tambychika and Meerah (2017), Moschkovich (2018), Bor-de Vries and Drijvers (2015), Ukobizaba et al. (2021), NoprianiLubis (2017), Phonapichat et al. (2013), Angateeah (2017), Saygili (2017), and Telaumbanua et al. (2017), conform with the result of the findings. They confirmed that students are finding difficulty in learning math, mainly, because

of the impact of COVID-19 pandemic on their academic achievement. They are so much overwhelmed by the learning activities in the different subjects which are usually submitted at the same time. Moreover, from the mentioned studies, they confirmed that there are reasons that can affect the problem-solving skills of the students. These are the following: (1) they struggle to understand the keywords that will be translated into mathematical statements, (2) they struggle to determine which assumptions to make and what information from the problem is required to solve it, (3) they struggle to understand a problem, as a result they frequently guess the solution without thinking, (4) they dislike reading long problems because they are impatient, and (5) they dislike reading mathematical problems.

Therefore, it can be recommended that teachers should assess their students on the possible factors which affect their performance especially that they are not yet ready to cope up with learning activities at school because of the impacts of pandemic. Further investigations on the causes and reasons of the low performance of the students should be done by assessing their demographic background, learning styles, and interests. The different learning theories can be adapted to enhance the teaching and learning strategies. From these, teachers may propose enhancement program on reviewing the basic concepts that should be mastered which are prerequisites on the required competencies in the current math subjects of the students. Also, with a constant practice, it will help the students to be familiar with the mathematical language or terms which students can relate to its practical uses.

B. Design Phase

Lesson exemplars were crafted and utilized in the study to address the issues and gaps in the problem-solving skill of the students. The flow of the learning activities is patterned from the 4A's (Anchor, Add, Apply, and Away) Model Framework of Jane Vella (2008). This is shown in Figure 2.

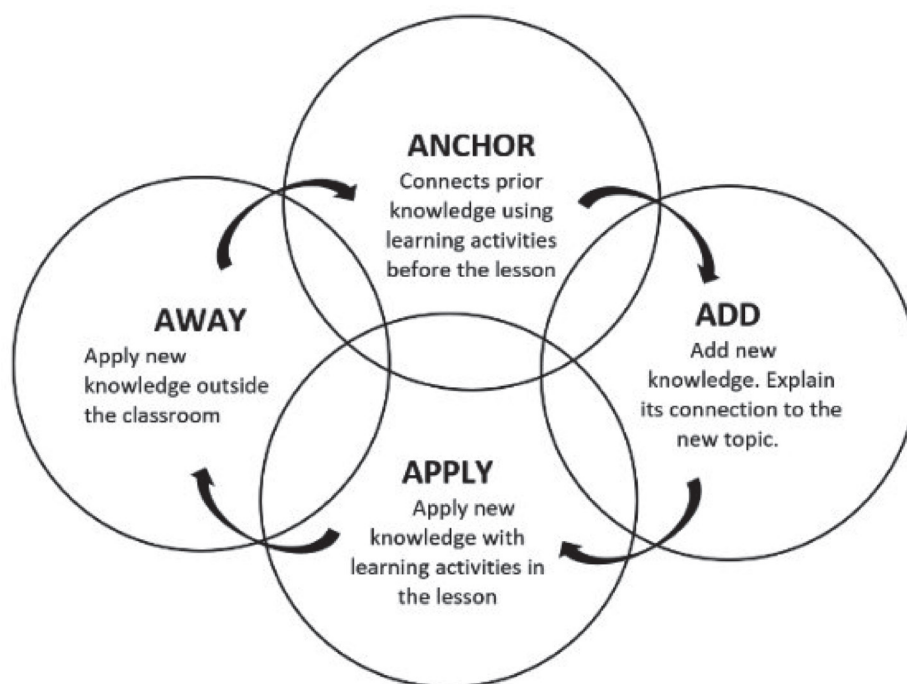


Figure 2. 4A's Model Framework

The idea of this framework and the issued format of the Department of Education were adapted in creating lesson exemplars. It is composed of the following parts: Objectives, Subject Matter, Learning Procedure, Evaluation, and Assessment.

This study used three lesson exemplars. The learning strategies in terms of real-world experiences, visual representations, and learning socially in groups are incorporated in these exemplars.

Real-World Experiences. The first lesson exemplar used real-world experiences to solve word problems. The teacher employed learning activities performing mathematical experiments to analyze real-world scenarios. This discussed the topic about the possible values of a random variable with the following learning competencies: (1) Illustrates a random variable (discrete and continuous), M11/12SP-IIIa-1; (2) Distinguishes between a discrete and a continuous random variable, M11/12SP-IIIa-2; (3) Finds the possible values of a random variable. M11/12SP-IIIa-3.

Visual Representation. The second lesson exemplar incorporated visual representations such as tree diagrams and graph to improve their problem-solving skill. It focused on the topic about the probability distributions of a random variable with the following learning competencies: (1) Illustrates a probability distribution for a discrete random variable and its properties, M11/12SP-IIIa-4; (2) Constructs the probability mass function of a discrete random variable and its corresponding histogram, M11/12SP-IIIa-5; (3) Computes probabilities corresponding to a given random variable. M11/12SP-IIIa-6.

Learning Socially in Groups. The third lesson exemplar integrated teaching strategy that students accomplished problem-solving tasks in group. The teacher discussed the mean and variance of a discrete random variable with the following learning competencies: (1) Illustrates the mean and variance of a discrete random variable, M11/12SP-IIIb-1; (2) Calculates the mean and the variance of a discrete random variable, M11/12SP-IIIb-2; (3) Interprets the mean and the variance of a discrete random variable, M11/12SP-IIIb-3; (4) Solves problems involving mean and variance of probability distributions, M11/12SP-IIIb-4.

Level of Acceptability of the Lesson Exemplars. The lesson exemplars were validated by three Master Teachers. To validate its content, this study modified the Rubrics in Evaluating PIVOT 4A Learner's Materials/Modules and IDEA Exemplars of Department of Education Schools Division Office of Calabarzon. The parts are the following: Purpose-Goals, Objectives, Anticipatory Set, Procedures, Special Accommodations, Closure, and Assessment.

C. Development Phase

In this phase, this discusses the effectiveness of lesson exemplars used in the delivery of instruction integrating the different learning strategies in terms of real-world experiences, visual representations, and learning socially in groups. This can be seen by interpreting and analyzing the results of the administered posttest and comparing it from the pretest scores. Based on the findings of this study, a modular skill enhancement strategy as an instructional intervention was developed to assist the students in developing their problem-solving skill.

Problem-Solving Skill of the Students Using the Posttest Results

Table 3 shows the level of problem-solving skills of the students using the learning strategies in each set of learning competencies through the administered posttest comparing it from the pretest scores. This reveals that the level of problem-solving skills of the students improved. From advanced beginner ($M=2.38$), the students became competent ($M=4.61$).

It can be inferred that among the strategies, learning socially in groups scored the lowest may be because of the following reasons: (1) In the assessment, students were not working in group, since the test is intended for individual assessment; (2) the learning competencies in this area requires higher level of thinking that they tend to forget some parts of the solutions that caused them to be directed in wrong interpretations, connections and transferring of ideas; (3) Some of the students did not learn specific parts in solving word problems when they were in group because they were overwhelmed with the presence of their classmates; (4) Some of the students were not encouraged to participate during the discussion of activities because there were large groups and the group leaders or the other member were dominating the task. Students learned best when they are engaged in real-world scenarios because they realize the importance and application of the subject. They also understood math using visual representations such as tree diagram and graph.

Table 3 Student's Problem-Solving Skill Based on Posttest Results

Learning Strategies	Pretest			Posttest		
	Mean	Rank	Level of Proficiency	Mean	Rank	Level of Proficiency
Real-world Experience	2.53	1	Advanced Beginner	5.20	1	Proficient
1. Illustrates a random variable (discrete and continuous). M11/12SP-IIIa-1						
2. Distinguishes between a discrete and a continuous random variable. M11/12SP-IIIa-2						
3. Finds the possible values of a random variable. M11/12SP-IIIa-3						
Visual Representation	2.48	2	Advanced Beginner	4.83	2	Proficient
4. Illustrates a probability distribution for a discrete random variable and its properties. M11/12SP-IIIa-4						
5. Constructs the probability mass function of a discrete random variable and its corresponding histogram. M11/12SP-IIIa-5						
6. Computes probabilities corresponding to a given random variable. M11/12SP-IIIa-6						

(Continued)

Table 3 Student's Problem-Solving Skill Based on Posttest Results—cont'd

Learning Socially in Groups						
7. Illustrates the mean and variance of a discrete random variable. M11/12SP-IIIb-1	2.15	3	Advanced Beginner	3.80	3	Competent
8. Calculates the mean and the variance of a discrete random variable. M11/12SP-IIIb-2						
9. Interprets the mean and the variance of a discrete random variable. M11/12SP-IIIb-3						
10. Solves problems involving mean and variance of probability distributions. M11/12SP-IIIb-4						
Overall Mean Scores	2.38		Advanced Beginner	4.61		Competent

Legend

Score		Level of Proficiency
6.41 - 8.00	=	Expert
4.81 - 6.40	=	Proficient
3.21 - 4.80	=	Competent
1.61 - 3.20	=	Advanced Beginner
0.00 - 1.60	=	Novice

The studies of Osman et al. (2018), Carden and Cline (2015), Bayazit (2013), Dewolf et al. (2017), and Santia (2019) conform with the result of this findings. They investigated the level of problem-solving skills using the two learning strategies, at the same time, in terms of real-world experiences and visual representation. They evidently showed that mathematical representation has an essential role in solving mathematical real-world problems.

From their samples, the students understand the relevance and meaningfulness of what they learn with the use of these strategies. They supported the idea that in order to improve the relation between mathematical skills from school to everyday life, the relevance of visualization methods and working memory to problem solving should be considered. The differences between the students and contexts can influence the use of visualization and some experience specific difficulties in this area.

Thus, a compendium of lesson exemplars should be developed integrating the learning activities through real-world experiences and visual representations. This will serve as one of the educational tools that will assist the students in developing their problem-solving skills.

Effectiveness of Lesson Exemplars Using the Different Learning Strategies

Table 4 shows the significant effects of lesson exemplars using the different learning strategies in each corresponding sets of learning competencies. The results reveal that there is a very highly significant difference between the pretest and posttest scores ($t=-10.44$, $p=.000$) with the use of lesson exemplars. This is supported by the Cohen's d result of 2.23 which is interpreted with large effect.

Table 4 Significant Effects of Lesson Exemplars to the Student's Problem-solving Skills Using the Pretest and Posttest Scores					
Learning Strategies	t	p-value	int	Cohen's d	Effect Size
Real-world Experience	-9.78	.000	VHS	2.17	Large Effect
1. Illustrates a random variable (discrete and continuous). M11/12SP-IIIa-1					
2. Distinguishes between a discrete and a continuous random variable. M11/12SP-IIIa-2					
3. Finds the possible values of a random variable. M11/12SP-IIIa-3	-8.43	.000	VHS	1.66	Large Effect
Visual Representation					
4. Illustrates a probability distribution for a discrete random variable and its properties. M11/12SP-IIIa-4					
5. Constructs the probability mass function of a discrete random variable and its corresponding histogram. M11/12SP-IIIa-5	-5.13	.000	VHS	1.06	Large Effect
6. Computes probabilities corresponding to a given random variable. M11/12SP-IIIa-6					
Learning Socially in Groups					
7. Illustrates the mean and variance of a discrete random variable. M11/12SP-IIIb-1	-5.13	.000	VHS	1.06	Large Effect
8. Calculates the mean and the variance of a discrete random variable. M11/12SP-IIIb-2					
9. Interprets the mean and the variance of a discrete random variable. M11/12SP-IIIb-3					
10. Solves problems involving mean and variance of probability distributions. M11/12SP-IIIb-4	-10.44	.000	VHS	2.23	Large Effect
Overall					

(Continued)

Legend:

t	=	t computed value
int	=	Interpretation
SI	=	Significantly Improved
df	=	Degrees of Freedom
p-value	=	Interpretation
p .001	=	Very Highly Significant (VHS)
.001p .01	=	Highly Significant (HS)
.01p .05	=	Significant (S)
p > .05	=	non-significant (NS)
Cohen's d	=	Effect Size
0.80 and above	=	Large Effect
0.50 - 0.79	=	Medium Effect
0.20 - 0.49	=	Small Effect
0.00 - 0.19	=	No Practical Effect

It signifies that the use of lesson exemplars incorporating the learning strategies in the delivery of instructions is significantly effective in developing the problem-solving skills of the students. It can be noted that the use of lesson exemplars can be used as educational resources to design instruction that best meets the needs of the learners based on the requirements of the curriculum. It is one of the teachers' tools in assisting students to improve their knowledge, and talents, and acquire the necessary mathematical skills, specifically problem-solving skills. This will not only develop the students' performance in school, but also the life-skills that they may be able to acquire from a quality and standardized set of teaching and learning activities. As this, students may become productive citizens.

In line with this, the studies of Fulay and Labo (2018), Mestiola (2018), and Wimshurst and Manning (2013) supported the findings of the study. Lesson exemplar sets a standard roadmap for a lesson that contains the detailed plan of the teacher in teaching a particular math topic. They confirmed that the use of these materials is an effective way to enhance the problem-solving skills of the students. It helps the students to build up a clear understanding of each activity because it sets a standard and quality among the other lesson guides. It also utilizes the best learning strategies bases on the learning styles and interests of the students that will be needed in completing activities in each part of the lesson. They concluded that not only did the provision exemplars improve students' overall grades for the unit they also enhanced student engagement with the subject.

Thus, the compilation of effective lesson exemplars in mathematics that develop the level of problem-solving skills of the students can be done to provide teachers and administrators with a set of exemplary guides in teaching and assessing students.

Modular Skill Enhancement Strategy as an Instructional Intervention

In the current study, a modular skill enhancement strategy was developed as a compendium of the enhanced lesson exemplars that this study created and used in the conduct of the lesson integrating the learning strategies in terms of real-world experiences, visual representations, and learning socially in groups. Since the enhanced lesson exemplars were transferred in crafting each lesson in the module, it follows the 4A's Model Framework of Learning by Jane Vella (2008). The module adapted the format used by the Department of Education in crafting modules last 2020. This has the following components: the cover page, module overview, and the parts per lesson topic which are *what I need to know*, *what I know*, *what's in*, *what's new*, *what is it*, *what I have learned*, *what I can do*, *assessment*, *answer key*, and *references*.

Conclusions

This study concluded that there are some probable reasons that students performed poor in solving word problems. These are the following: (1) students were not yet ready on face-to-face learning activities because of pandemic that impacted their performance in mathematics; (2) some of the mathematical tasks given are not familiar to them especially the mathematical language or terms which are not used every day; (3) they cannot complete the tasks because these are categorized as part of higher levels of educational learning objectives; and (4) students lack willingness to solve the problem because it requires steps to follow before arriving at the correct answer. Problem-solving skill of the students in mathematics can be improved using learning strategies in terms of real-world experiences and visual representations with the use of lesson exemplars integrating these strategies. Lesson exemplars can be used as educational resources to design instruction that best meets the needs of the learners based on the requirements of the curriculum. It can be one of the teachers' tools in assisting students to improve their knowledge, and talents, and acquire the necessary mathematical skills, specifically problem-solving skills. This will not only develop the students' performance in school, but also the life-skills that they may be able to acquire from a quality and standardized set of teaching and learning activities. As this, students may become productive citizens.

Recommendations

Teachers may assess their students on the possible factors which affect their performance. They can further investigate on the causes and reasons of the low performance of the students. It can be done by assessing their demographic background, learning styles, and interests. From their gathered data, enhancement program on reviewing the basic concepts in mathematics as prerequisites can be implemented. To assist this, a compendium of lesson exemplars can be developed integrating the activities through real-world experiences and visual representations to provide teachers and school administrators with a set of exemplary guides in teaching and assessing students' development in problem-solving skill in mathematics.

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KAES-GURO: A Mentoring Program in Improving Students' Reading Proficiency

Princess Jane Pandi-Ruedas and Julieta T. Canda

Abstract

This study aimed to improve the reading proficiency of Grade 8 mentees. Specifically, the study focused on 1) the profile of 34 mentees in terms of their reading proficiency level in the five skills taught namely: phonetic analysis and vocabulary building for word recognition, noting details, predicting outcomes and drawing conclusions for comprehension; 2) the profile of 41 mentors in terms of their English 10 grade and reading proficiency level on the same skills tested for the mentees; 3) a mentoring program that could be implemented in improving reading; 4) modules to be used in the implementation of the mentoring program; and 5) how effective was the peer mentoring reading program according to both participants. Mentoring sessions were conducted in three cycles for each domain following the principles of an action research - planning, acting, observing and reflecting stages. There were 41 mentors and 34 mentees involved in the study. Focused Group Discussion (FGD) was conducted to probe the efficiency of the KAES-GURO mentoring program. To compare the increase of pre-test and post-test results, percentages were used as statistical measures. It can be gleaned from the findings that the mentoring program improved the mentees' reading proficiency; thus, effective. It is then recommended to implement the KAES-GURO mentoring program as an intervention program in the school; encourage teachers to apply the concepts of action research in answering classroom-based problems and difficulties, fitted for their type of learners; and that the ideology of the mentoring program to be replicated in other subject areas.

Key Words: Reading Intervention, Peer Mentoring, Action Research

Introduction

Reading is a constant life skill used at school and throughout life. It is a basic macro skill. Without the capacity to read well, a lot of opportunities for individual's accomplishment and job fulfilment may be lost and seems impossible (Anderson, Hiebert, Scott, & Wilkinson, 1985) – from understanding the instructions in a medicine bottle, filling out applications, and reading road or warning signs (Davis, 2016). With its importance, a lot of evidences still support problems with literacy in many aspects of the world. The United Nations International Children's Emergency Fund's (UNICEF), report January 2018 shows that the number of literate youths declined from 170 million to 115 million. In addition, it has been found that literacy is lowest in least developed countries ("Literacy", 2018) since education is not seen as a priority and only perceived as limitation to development. One true example of this claim is in Niger where there is only 36.6% of youth's literacy rate (Roser & Espina, 2015).

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Moreover, in the Philippines, a UNESCO mid-decade assessment report of Southeast Asian education systems (2008), found out that the Philippines had fallen drastically in terms of participation and achievement rates in basic education. Statistics show that the youth literacy rate in the country is still high by regional criteria; however, the 1.5 percent drop in 1990 and 2003 compared, where 96.6 percent is downed to 95.1 percent evidently show a declining literacy rate in the country (Macha, Mackie, Magaziner, 2018). Moreover, from 2013 to 2015, data shows a drop of 3.775 in the youth literacy from ages 15 to 24.

To bridge the growing problem, a number of intervention strategies have been suggested to remedy it, one of which is peer mentoring program (Gensemner, 2000). Mentoring is a means of passing on values and instilling students' hope in the future. As children need positive role models and interpersonal connections to help shape their identity development, the concept of mentoring helps achieve these. With these notions and claims, it is equally important to present the concepts gathered by the researcher that could be associated to reading, and intervention programs using action research.

Reading. From time-to-time people have wondered why reading is important since we take for granted its fundamental role functioning in today's society. According to Davis (2016), reading is essential, since spoken and written words, are one of the building blocks of life. Kose (2006) stated that when dealing with reading, people encounter two layers of reality: one that they can see and one that they cannot see. He further specified that the purpose of reading is to make the underlying meaning, visible and clear. Research has made known that the degree of awareness a child has in the underlying phonological structure of words, is a contributory factor to the success of a learner. Another factor is reading comprehension which was defined by Kintsch (2014), as the process of generating meaning from text being read.

Intervention Program. In the study of Cho (2010), he stated that improving reading in schools could be augmented through intervention programs (Cho, 2010). Reading intervention programs and their approaches have long been proven to be of help to students who find reading difficult. According to the National Educational Services (NEPS), evidences show that well-targeted and well carried interventions can be effective for students from varied range of backgrounds and abilities (Aton, 2014). In addition, Brooks (2009) revealed that when it comes to managing failing grades, distinct interventions are essential since it has been observed that the usual class instruction is not enough.

Action Research. According to Burns (2010), research is only effective when it is crafted with personal significance; thus, action research is more meaningful and authentic when it is conducted personally by a teacher-researcher in his/her own space. Action research aids teachers "pick up threads suggested in academic circles, and weave them in their own classroom" (Mills, 2011). Moreover, Burns (2010) further explained that action research provides teachers the framework to build their personal classroom developments by giving teachers a room for opportunities to identify the changes they need to do in their teaching practices.

In context, Philsaga High School Foundation, Incorporated (PHSFI), under the Division of Agusan del Sur has its shared challenges when it comes to reading difficulties of the students. For the past years, it has been observed that there is an alarming number of non-readers present in almost all year levels, despite the conducted intervention programs. With this, the school decided to make a reading test as part of the enrolment process for the incoming Grade 7 students which started last academic year 2017-2018 by testing the skills namely: word recognition and comprehension. The reading test results revealed that 38 out of 241 enrollees were struggling both in the two named skills.

Hence, to further augment the challenge, the researcher, as the Reading Coordinator of the school, used peer mentoring program where struggling readers were mentored by the Grade 11-General Academic Strand (GAS) students who were profiled accordingly. Mentoring was one of the Grade 11 students' requirements in their subject Reading and Writing Skills. On the other hand, readers were grouped in one section. However, to prove the problem, a validated Reading Test was given to them to further assess their reading levels. Since the G-11 students stand as mentors to the G-1 mentees, the reading program was called Kaes-Guro which stands for 'kaeskwela ko, guro ko'. At the onset of the mentoring program, four (4) of the mentees moved to another school due to transfer of residence, thus, making them 34.

The never-ending problem in reading of the school prompted the researcher to conduct action research which aims to improve the students' reading proficiency level through a peer mentoring reading program. It focused on 1) the reading proficiency level in the five skills taught to the 34 mentees; and 2) the efficacy of the peer mentoring reading program. Proven successful, this would help the researcher envision a considerable answer to one of the most common problems faced by the teachers in the reading classrooms.

Methodology

Research Design

According to Leo Van Lier (1994), action research is "traditionally depicted as a spiral consisting of cycles of several steps - goal setting, planning, acting, observing and reflecting.", as shown in Figure 2.

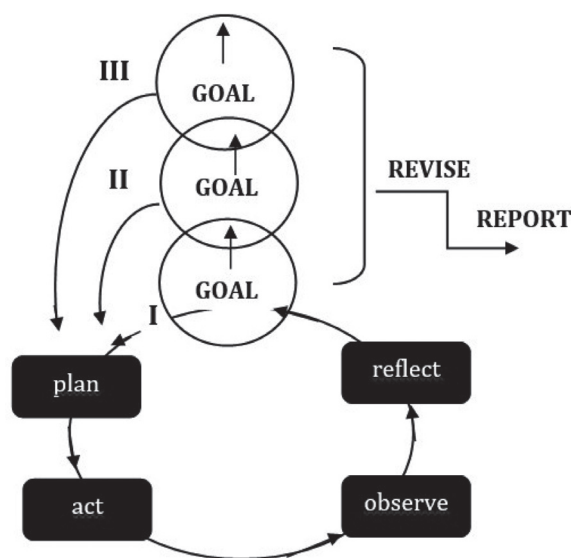


Figure 2. The different parts of action research depicting the cycles of several steps.

The first stage begins with a series of goals set by the researcher. The second stage was the planning on some kind of actions based on the defined goal. The third stage was the acting which carried out the planned actions to meet the desirable end. The fourth stage was the observation which was to observe the process preferably with a partner. And the last stage was the reflection where the researcher would validate the effectiveness of the mentoring program through the validated post-test results, and the over-all evaluation of the program through a FGD with the mentors and mentees.

Sampling Procedure and Participants

As to how the mentees were initially selected, the school conducted an informal reading test on the academic year 2017-2018 as part of the enrolment process for incoming Grade 7 students and it was found out that 38 of them really could not read. To faithfully assist the following students, a validated Reading Test was given and the results revealed that all 34 prospect non-readers were under the frustration reading level. The mentee-participants were down to 34 since four (4) of them transferred residence. The mentor-participants were also selected. The researcher, as the Reading and Writing Skills (RWS) teacher of Grade 11-Rizal, informed the SHS students to have mentoring as one of their activities for the course.

To ensure that these students could really be able to mentor the selected mentees, their English 10 grades and reading proficiency level were considered. Their grades revealed that they were all proficient and advanced. On the other hand, their reading proficiency level were also obtained by taking the same test with the mentees; thus, revealed that all of them fall on the Independent Level. Aside from that, the researcher, as their teacher and facilitator, also made a month-long preparation, equipping the mentors with necessary skills to help them deal with the mentees. Furthermore, there were 34 mentees and 41 mentors included in the KAES – GURO mentoring program.

Data Collection

The following are used to collect data for the study: the questionnaire with pre-test and post test items, participants' observation notes, FGD, and evaluation sheets.

Questionnaire with pre-test/post-test items. In gathering the data, a pre-test was constructed based on the least learned skills revealed from the reading test. The pre-test was validated by the three (3) experts in reading. The pre-test was a 35-item test that focused on the different reading skills specifically on using phonetics, vocabulary building, noting details, predicting outcomes and drawing conclusions. On the other hand, the same test was used during the post-test; however, the items from the pre-test were re-arranged.

Focused group discussion (FGD). A focused group discussion was conducted every after each completed reading skill (using phonetics, vocabulary building, noting details, predicting outcomes and drawing conclusions). The success of the study depended on the increase of their scores from pre-test to post-test; hence, they were interviewed by the researcher as to the difficulties, advantages, disadvantages, efficacy and recommendations they could provide every after each cycle of the study that would aim to improve the KAES – GURO Mentoring Program.

Evaluation sheets. After the validated post-test was conducted, evaluation sheets were given to mentor-participants which consisted the difficulties, advantages, disadvantages, efficacy and recommendations they could give for the mentoring program. This wrapped up the comments from both participants in creating a better version of the reading program.

In getting the reading proficiency level of the students, the equivalent verbal description of the percentage scores of the participants' reading proficiency is determined using the scale and the descriptive rating established by Burns and Roe (2007) in the book *Informal Teaching Reading in Today's Reading Inventory*, presented in Table 1.

Table 1 Reference Scale of the Reading Level established by Burns & Roe

Percentage score	Verbal description
60 - 100%	Independent
41 - 59%	Instructional
0 - 40%	Frustration

Results and Discussions

This section presents the results of the peer mentoring program undertaken by the participants. Furthermore, this gives answers to specific problems in Chapter 1.

A. The Reading Proficiency Level of The Mentee-Participants in Terms of Word Recognition and Comprehension

Table 2 Profile of Mentee Participants in terms of Word Recognition (Validated Pre Test)

Reading proficiency level		Phonetic analysis (10 items)		Vocabulary building (10 items)	
Level	Score Equivalence	Frequency	Percentage	Frequency	Percentage
Frustration	0 – 4	28	82%	32	94%
Instructional	5	6	18%	2	6%
Independent	6 – 10	0	0%	0%	0%
Total		34	100%	34	100%

Since most of the mentees fall on the frustration reading level, this means that these mentees have difficulty in reading and still need thorough guidance from the teachers or mentors in word recognition. Out of the 32 mentees or 94% under the frustration reading level in vocabulary building, two (2) of them even got zero (0) which means that they really need extra help on this area. As to the difficulty of the two skills, it could be observed that there are more mentees who fall on the frustration reading level in vocabulary building. This means that vocabulary building is more difficult than phonetic analysis. This connection could also be explained since a student could not be able to recognize the meaning of the word in the vocabulary building if he/she could not read the sounds a letter could create in the phonetic analysis (Kose, 2006).

Mentees who belong to the frustration reading level in all the sub skills of comprehension means that they still have difficulty in reading and therefore need the thorough guidance of teachers or mentors. More so, the mentee participants profile revealed that although some of them fall on the Instructional Level on a specific sub skill, all of them are still considered ‘recipients’ of the program since they failed on one or the other sub – skills needed for them to become holistically independent readers. This result may be true to Kintsch (1998) study that comprehension is getting the whole gist of the text being read rather than just acquiring the denotation of the individual words in sentences – which is evident as students of today come to interpret the meaning of sentences in a word-by-word basis.

Table 3 Profile of Mentee Participants in terms of Comprehension (Validated Pre-Test)

Reading Proficiency Level		Noting Details (5)		Predicting Outcomes (5)		Drawing Conclusions (5)	
Level	Score Equivalence	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Frustration	0 – 2	27	79%	30	88%	33	97%
Instructional	3	7	21%	4	12%	1	3%
Independent	4 – 5	0	0%	0	0%	0	0%
Total		34	100%	34	100%	34	100%

B. Efficacy Of The Peer Mentoring Reading Program

The improvement of the reading proficiency of the mentee participants can be manifested through the increase of the proficiency level marked by their scores in post-test as compared to the pre-test.

Table 4 Mentee Participants' Score Equivalence in Validated Pre-Test and Post-Test

Reading Proficiency Level		Pre – Test		Post – Test	
Level	Score Equivalence	Frequency	Percentage	Frequency	Percentage
Frustration	0 – 14	33	97.06%	0	0%
Instructional	15 – 20	1	2.94%	0	0%
Independent	21 – 35	0	0%	34	100%
	Total	34	100%	34	100%

The findings showed that after undertaking the mentoring program, the mentees were able to improve the five focused reading skills: using phonetic analysis, vocabulary building, noting details, predicting outcomes and drawing conclusions. This happened after the cyclical steps conducted with three cycles in each domain. This result would be a support to Mercer's (2003) claim that in each classroom, students are learning on numerous levels and at diverse paces. Just like what is presented in this study, it took the researcher three cycles for each domain since mentees have varied pacing in learning.

Conclusion

As this study aims to improve the reading proficiency of the grade 8 mentees, the success of the mentees to actually improve their performance in reading helps them unlock the door to lifelong learning, as reading is necessary for learning (George, 2019). In each classroom, students are learning in diverse levels and paces. With the study, teachers may want to use mentoring program as an intervention to assist their learners with reading difficulties in the classroom improve while still fostering the needs of the independent learners in the class.

The findings showed that the reading proficiency of Grade 8 mentees on the onset of the study belongs to the frustration and instructional levels; thus, need the thorough guidance from teachers. After undertaking the mentoring program, the mentees were able to improve the five (5) focused reading skills. This happened

after the cyclical steps conducted with three cycles in each domain. On the other hand, mentors' profile was also considered as to their English 10 grades and their reading proficiency level. It was found that all mentors had grades equivalent to Proficient and Advanced. All of them even fall on the Independent Level of the reading proficiency with five mistakes as the lowest score and perfect score (35) as the highest which proved that all mentors were indeed capable of mentoring the Grade 8 mentees. Thus, a mentoring program called Kaes-Guro was used which stands for *Kaeskwele Ko, Guro Ko*. This ran through a module titled *Reading Enrichment with Ate & Kuya* (REAK) which gave both participants a mixture of simple to complex exercises that would enhance students' ability in the skills being developed. The Kaes-Guro mentoring program was found to be effective according to the improvement on the test results of the mentees from pre-test to post-test. It was further backed-up by the observation notes, FGD and evaluation sheets given to both participants.

Furthermore, the researcher would like to conclude that hence, action research could be very useful in the classroom setting. The three cycles conducted proved that students in the classroom have varied needs and levels that could not be met using one strategy or in an hour of class discussion. Thus, to improve reading, cyclical steps should be done to ensure that all of them could be given the extra leap they need in order to be helped.

Recommendations

With the success of the mentoring program in improving students reading proficiency, notable limitations were noted. One was the supervision issues during the implementation of the program. Since there were 41 mentors and 34 mentees every session, there was really a great number of students to be supervised by the researcher – from getting the attendance of mentors a course requirement, conduct of parallel sessions, giving of snacks to mentees, and to restoration during every session. With the great number of participants, sometimes it would tend to become noisy for a classroom built for 60 students. Thus, the researcher recommends future researchers conduct the mentoring sessions in separate classrooms with a specific number of students per classroom, with five (5) to seven (7) pairs of mentor-mentees.

Second, although the KAES-GURO mentoring program had been effective to these set of Grade 8 mentees, the findings may not be true when given to other set of students. A lot of factors may also arise during the implementation that is not similar to what the researcher did in this study. Thus, future researchers should really be flexible enough to meet and fix the issues for every session raised by both participants. In doing so, the researcher would like to agree to Van Lier (1994) statements that, “as anyone doing action research will soon find out, reality is a whole lot messier than that, and in practice the various stages will blend in with one another, or perhaps gradually advance all together like strands in a rope we are twining. Thus, the important thing to remember is that all the ingredients must occur in a balanced and carefully monitored way.”

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Skills Training on Bread and Pastry Production an Extension Program

Mark Jonnel S. Ilagan

Abstract

This study aims to provide quality education through outcome-based instruction. The conduct of various activities will help in the progress of students as well as the institution. One of the said activities is the conduct of an extension project that is beneficial in the community where this project is initiated. As one of the institutions who implements this kind of initiative, Laguna State Polytechnic University through the subject 'Management of Research and Extension' conducted an extension project to the different community within Laguna and Quezon province. Ms. Charlene P. Calatrava, who is a professional baker, discussed simple way on producing profitable 'Ube Pandesal' and 'Chiffon Cake' that can be a simple income generating of women of Brgy. Mapagong. According to a random interview with some of the participants, they appreciated the activity and were grateful that it was held in order to make basic bread that can be a start of business.

Key Words: Quality Education, Outcome-Based Instruction, Extension Project

Rationale

One of the goals of any educational institution is to provide quality education through outcome-based instruction. The conduct of various activities will help in the progress of students as well as the institution. One of the said activities is the conduct of an extension project that is beneficial in the community where this project is initiated.

As one of the institutions who implements this kind of initiative, Laguna State Polytechnic University through the subject 'Management of Research and Extension' conducted an extension project to the different community within Laguna and Quezon province.

Team Quezon planned to conduct its extension project at Sitio Ulboc, Brgy. Mapagong, Pagbilao, Quezon which focus on the training need assessment on bread and pastry production. The beneficiaries of the said training are the unemployed women of the barangay.

In order to deliver the extension program of Team Quezon to the community that needs it most, the team come up with conceptualizing the planned after the first meeting of the subject last September 3, 2022. Through the initiative of the project leader, Mr. Frannie Rodil, the team conducted its initial meeting via google meet last September 3, 2022.

During the meeting, the team conceptualized the plans on how they will start their extension program. The team is composed of students from Quezon, Marinduque and Laguna province. The project leader was Mr.

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Frannie Rodil and Mr. Lemuel Untivero as assistant project leader. In the meeting, formulation of research title and identification of the community respondent was done. The committee decided that Barangay Mapagong, Pagbilao, Quezon would be the recipient of the said program.

On September 5, 2022, a letter of intent was sent to the recipient barangay prior to the consultation meeting with the Barangay Officials for the approval of the said activities.

On September 10, 2022, the team presented their research proposal to Dr. Vilma Geronimo and the class for comments and suggestions. The research proposal is entitled, “Training Needs Assessment in Pastry Production in Sitio Ulbok, Brgy. Mapagong, Pagbilao, Quezon: Input to CTE GSAR Extension Program”.

The team conducted its initial survey last September 17, 2022 to know the training needs assessment of women of Brgy. Mapagong. Based on the survey, 43 out of 60 or 72% of women who answered the survey choose Bread and Pastry Production as their training needs assessment. 9 out of 60 or 15% choose Food Processing while 4 out of 60 or 7% choose Fish Deboning and 4 out of 60 or 7% respondents put other training they needs. With this result, the team decided to conduct extension program about skills in in bread and pastry making.

On September 19, 2022, the research team forwarded a letter seeking for consent to conduct the said extension program in the said barangay. Upon the approval of the barangay, the team initiated its virtual meeting in order to plan the things they need to prepare for the said extension program. Based on the meeting, the program will be held on October 2, 2022 at Mapagong – Alupaye Elementary School at Sitio Ulbok, Brgy. Mapagong, Pagbilao, Quezon.

An invited speaker will demonstrate certain knowledge in baking to selected 15 women of the barangay. The team also discussed about the things they need to prepare for the upcoming extension program.

During the Program

Selected 15 women of the barangay arrived at Mapagong – Alupaye Elementary School at exactly 9:00 in the morning.

The program started with an opening prayer led by Mr. Mark Jonnel S. Ilagan followed by the singing of the Philippine National Anthem through audio – visual presentation. An opening message was given by Mr. Jimmy Romasanta, one of the member of the team. On his message, he welcomed the participants on the said training.

An inspirational message was given by Hon. Lorna P. Lusterio, the barangay captain of Brgy. Mapagong which represented by Brgy. Councilor, Pablo Nalogoc Jr. In his message, he was very happy to the team because they choose Brgy. Mapagong to be the recipient of the said extension program. Dr. Roxanne M. Edrad, the school head of Mapagong – Alupaye ES also gave her message to the participants. Mr. Lemuel Untivero, the program facilitator, have the roll call of participants.

Aside from team Quezon, also present during this event were the students from team Calamba and team Sta. Cruz. Mrs. Catherine R. Mangubat, one of the member of team Quezon gave the rationale of the training. An inspirational message was given by Dr. Vilma Geronimo, the class professor of ELM 409 subject, management of research and extension. Mr. Frannie M. Rodil, the team leader, introduce the guest speaker.

Dr. Vilma Geronimo together with Ms. La Reine Uriza and Mr. Jon Michael L. Austria gave the certificate of appreciation to the guest speaker, to Brgy. Mapagong and Mapagong – Alupaye Elementary School. Members of the team Quezon, also received certificates for their unselfish effort to make the event a success.

At the end, Mr. Joel A. Porta, delivered his closing remarks. On his speech, he encourages the participants to continue the learning they gain on this extension program.

The program ended at 12:30 in the afternoon.

Objectives

At the end of the seminar, the participants are expected to:

1. Demonstrate core concept in baking theory and methodology through hands – on development;
2. Provide skills and training opportunities for the beneficiaries in the barangay;
3. Make them employable and productive.

Beneficiaries

The beneficiaries of the seminar are the fifty (50) residents of Brgy. Mapagong, Pagbilao, Quezon

Implementing Strategies

The speaker discussed the bread and pastry making by demonstrating the process on how to produce ‘Ube pandesal’ and ‘Chiffon Cake’.

After the discussion, questions and clarifications were also welcomed in order to have a deeper knowledge of the topic at hand.

Related Studies

Knowledge of the procedures

Anggraeni (2021) shows in her research that the students of DIII Hospitality Harapan Bersama Polytechnic in Tegal are equipped with a number of productive courses, one of which is the Pastry course, where this course learns from the preparation, manufacturing, serving to storage of bread and cake with standard recipe specifications and company practices. But the knowledge of some students is still very low in the material “Flour” so it is feared that it will affect the readiness in the implementation of pastry practices.

BLACKWELL; MINIARD; ENGEL, (2013). stated that the consumer can perform searches on his memory (internal search) or external sources of information (external search). The internal search occurs when consumers demand information on their prior knowledge about products, services, companies, brands or businesses acquired over time, including the buying and consumption past experience. The external search is characterized by information found from the search carried out in various sources such as radio, newspapers, magazines, television, Internet, billboards, and many others. In addition, sources for the external search also consists of relatives, friends, co-workers, experts and other opinion-forming groups able to influence consumers decisions

Skills

Investopedia, (2016) stated that Technical skills can refer to the ability to perform tasks that require the use of certain tools, whether tangible or intangible, and technology to complete them. In this regard, the knowledge in a technical skills area is seen as practical in nature as it allows a person to complete a designated task in a real, not theoretical way. Given the growth of technology within the economy, the need for technical skills is likely to continue to grow.

Serpa Juan, (2014) stated that the Technical skills are known as a specific skill which the person may possess through learning and practice. Technical Skills are the source of learning of the students which it can acquire through studying and applying. It is also refer to talent and expertise which the person possesses to perform a certain job or skill. These skills can now be identified by the teachers and students. Technical skills are also known as hard skills or skills that are more on practice rather than theory. You may acquire technical skills through experience or pursuing it as specialization.

Garduque (2012) shows in his study stated that learning theories were not enough we need to have skills to do things. Those skills are technical skills and livelihood programs which may help the students and graduates to become skilled workers of the future.

It is supported with R.A. 7796- An Act creating the Technical Education and Skills Development Authority, Providing for it proves, structure and for other purposes. The Act states its goals and objectives that it strengthens technical skills, to develop those skills and also the moral character, work ethics and nationalism.

The DepEd Order No. 31 s. 2012 K to 12 curriculum has been implemented already for the high school. The program aims to focus not only on the academic field of the learners but also to the technical and livelihood skills they have. “Products/Performances” refers to real-life application of understanding as evidence by the student’s performance of authentic tasks. That is why modules for exploratory courses and specialization are created to develop simultaneously the technical skills and academic standard of the student.

Training Materials

Quiroga Souki (2016) stated that even traditional bakeries have shifted to modern techniques and the use of better equipment and technology, it has become easier to standardize recipes and thereby open themselves up to expansion via franchising. The success of bakery chains like Julie’s Bakeshop, Panaderia Pantoja and Pan de Manila are proof of this.

As stated In the book baking and pastry equipment 3, A baker’s art and craft involves simple tools. Learning to become a successful baker requires developing a great deal of manual skill using these tools. For example, a pastry bag is nothing more than a cone-shaped piece of fabric or plastic, open at both ends. Although its construction is simple, and no operating manual is required to understand how it works, hours of practice are necessary to become skilled at using a pastry bag for decorative work.

At the other extreme are large machines such as floor-model mixers, ovens of many types, and dough-handling equipment such as molders, dividers, and sheeters. Of these, perhaps only ovens are essential to a baker’s work.

The other items are important labor-saving devices that enable workers to produce goods 42 CHAPTER 3 Baking and Pastry Equipment in large quantities with greater speed. Without this equipment, much of the output of a bakeshop would not be economically feasible.

Impact/Outcomes

Ms. Charlene P. Calatrava, who is a professional baker, discussed simple way on producing profitable 'Ube Pandesal' and 'Chiffon Cake' that can be a simple income generating of women of Brgy. Mapagong.

According to a random interview with some of the participants, they appreciated the activity and were grateful that it was held in order to make basic bread that can be a start of business.

Training Evaluation and Results

Table 1	Skills Training on Bread and Pastry Production as to Content/Paksang Seminar/Training			
Statement		Weighted Mean	SD	Remarks
1. The topics are well organized and systematically discussed. (Ang paksa ay natalakay nang kumpleto at detalyado.)		4.93	0.24964	Strongly agree
2. The topics are relevant and vital to my work/task. (Ang mga paksang natalakay ay mahalaga at kapakinabang.)		4.93	0.24964	Strongly agree
3. The topics are timely. (Napapanahon ang mga impormasyong ibinahagi.)		4.93	0.24964	Strongly agree
Grand Mean:		4.93		
Population Standard Deviation:		0.248		
Verbal Interpretation:		Strongly agree		

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Evident
4	3.40-4.19	Agree	Evident
3	2.60-3.39	Moderately Agree	Moderately Evident
2	1.80-2.59	Disagree	Less Evident
1	1.00-1.79	Strongly Disagree	Not Evident

Table 2	Skills Training on Bread and Pastry Production as to Materials/Kagamitang Pantalakay		
Statement	Weighted Mean	SD	Remarks
1. The materials are available and prepared before the activity start. (Kumpleto ang lahat ng kinakailangang kagamitan.)	4.85	0.46986	Strongly Agree
2. The visual aids and handouts were helpful in facilitating inputs and generating outputs. (Lubos na nakatulong ang mga visuals at handouts.)	4.85	0.46986	Strongly Agree
Grand Mean:	4.85		
Population Standard Deviation:	0.467		
Verbal Interpretation:	Strongly Agree		

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Evident
4	3.40-4.19	Agree	Evident
3	2.60-3.39	Moderately Agree	Moderately Evident
2	1.80-2.59	Disagree	Less Evident
1	1.00-1.79	Strongly Disagree	Not Evident

Table 3	Skills Training on Bread and Pastry Production as to Resource Person/ Tagapagsalita		
Statement	Weighted Mean	SD	Remarks
1. Knowledgeable and well-versed in the topic. (Malawak ang kaalaman ukol sa paksa.)	4.96	0.29488	Strongly Agree
2. Concepts were clearly discussed. (Malinaw na natalakay at naipaliwanag ang mga konsepto.)	4.96	0.29488	Strongly Agree
3. Responsive to questions/issues raised by participants. (Nasagot ng malinaw at kumpleto ang mga katanungan.)	5.00	0	Strongly Agree
4. Well-poised, alert and can hold participants' attention. (May sigla at buhay ang paraan ng pagtalakay.)	4.98	0.14744	Strongly Agree
5. Motivated the participants to actively involve. (Nahikayat ang mga dumalo na aktibong lumahok sa Gawain.)	4.98	0.14744	Strongly Agree
Grand Mean:	4.976		
Population Standard Deviation:	0.207		
Verbal Interpretation:	Strongly Agree		

(Continued)

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Evident
4	3.40-4.19	Agree	Evident
3	2.60-3.39	Moderately Agree	Moderately Evident
2	1.80-2.59	Disagree	Less Evident
1	1.00-1.79	Strongly Disagree	Not Evident

Table 4**Skills Training on Bread and Pastry Production as to Overall Evaluation/Pangkalahatang Pagtataya**

Statement	Weighted Mean	SD	Remarks
1. The entire program is well-organized. (Maayos ang pagdaos ng programa.)	4.91	0.35441	Strongly Agree
2. The program objectives are attained. (Ang mga layunin ng programa ay nakamit.)	4.89	0.37879	Strongly Agree
Grand Mean:	4.900		
Population Standard Deviation:	0.365		
Verbal Interpretation:	Strongly Agree		

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Evident
4	3.40-4.19	Agree	Evident
3	2.60-3.39	Moderately Agree	Moderately Evident
2	1.80-2.59	Disagree	Less Evident
1	1.00-1.79	Strongly Disagree	Not Evident

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INNOVATIVE SCHOOL EXPERIMENTS

Breaking Barriers: Making Hands-On Science Learning Accessible for Students with Visual Impairment at Middle Stage

Dr. Anjni Koul and Dr. Ashish Kumar Srivastava

Abstract

In the inclusive classrooms of today, children of mixed abilities sit together. Generally science teaching is done through visual instructions, due to which, it is difficult for visually impaired students to understand concepts of science. In order to understand science better, they need to be given hands on as sighted students. In this paper, it is suggested that the classroom environment needs to be adapted to cater the needs of such students. These students learn by using senses such as touch, hear and smell. The activities usually given in the textbooks of science have to be modified for these children; not only for their safety but also to make them understand the concepts by doing, so that they can pursue a career in science.

Key Words: Visually Impaired, Science Activities, Inclusive Classroom, Classroom Adaptations, Middle Level

One of the fundamental principles “full equity and inclusion as the cornerstone of all educational decisions to ensure that all students are able to thrive in the education system.”

NEP 2020

Introduction and Review of Literature

Inclusion model of schooling is where children irrespective of their abilities or skills need to learn together. Inclusion discards the use of special classroom to separate children with disabilities from children without disabilities. Inclusive education promotes the same curriculum for all the children of that stage. It also encourages that children learn at their own pace and in their own way. This is only possible if our teachers have patience, optimism and generosity to bring out the best from her students. She has to make every student feel important and appreciate their work. Stofflett, 1998 pointed out that the traditional classroom often looks like a one-person show with largely uninvolved learners. Traditional classes are usually dominated by direct and unilateral instruction. The traditional approach followers assume that there is a fixed body of knowledge that the student must come to know. Students are expected to follow the information they are given without questioning the instructor. Even in the activities based subjects, although activities are done in a group but do

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not encourage discussion or exploration of the concepts involved. This tends to overlook the critical thinking and unifying concepts essential to true science literacy and appreciation (Yore, 2001). If learners are provided the opportunity to think and solve the problems on their own then the learning becomes long lasting.

In the school system usually textbooks are considered to be one of the important resources for teaching-learning process. These are produced in large number and can have a large outreach. Textbooks are especially relevant to improve learning outcomes in low income countries with large classroom size. Usually textbooks are the only available resource with the students and are considered as a most powerful tool of the education system. The textbooks are being used by both special and non-special students.

In India, the National Council of Educational Research and Training (NCERT) is a leading body for school education. It is an autonomous body constituted by the Government of India. The main functions of this organisation are: curriculum development; research; teacher training; extension activities; evaluation and consultancy. The National Curriculum Framework-2005 (NCF-2005) developed by NCERT, recommends the pedagogy of science with the focus on hands-on experiences and inquiry based processes (NCERT, 2005a). The feeder paper of NCF, Focus Group Position Paper on Teaching of Science (NCERT, 2005b) discusses about process validity that leads to generation and validation of scientific knowledge, nurture the natural curiosity and creativity of a child. It also advocates that inclusion needs to be implemented in all schools and throughout Indian education system. The participation of all children needs to be ensured in all spheres of their life in and outside the schools. Schools need to become centres that prepare children for life and ensure that all children, especially the differently abled children from marginalized sections, and children in difficult circumstances get the maximum benefit of education. In nut shell, inclusive education refers to an education system that accommodates all children regardless of their physical, intellectual, social, emotional, linguistic or other conditions. For the development of social skills and better social interaction of the students, inclusive education is the need of education system.

National Education Policy also recommends that in all stages of school education, experiential learning will be adopted, including hands-on learning (NEP, 2020).

NCERT develops textbooks in almost all the subjects for classes I to XII. These textbooks are for special and non-special students. In science textbooks emphasis is on learning by doing. It has been observed that the use of traditional methods of teaching science results in the rote learning and lack of understanding of concepts (Koul, A.2014; Koul, A. & Wazalwar, A.K.2014).

If proper resources are not available, then teachers are bound to choose traditional way of teaching. The important feature of activity based teaching is that it is learner centric. It also allows the learner to study according to his / her own ability and skills. Studies have shown that activity based teaching is more effective for the development of higher order skills among students (Khan, M., et al., 2012). It has also been observed that students with disabilities benefit from learning science through the activity-oriented approach (Mastropieri, M. A., & Scruggs, T. E. 1994).

Literature shows that most science teachers have little or no direct experience in teaching disabled students (Stefanich & Norman, 1996). It has also been reported that special education teachers often lack science content and science pedagogy knowledge (McCarthy, 2005). It should be remembered that students with low vision or visually impaired have same range of cognitive level as other students of their class (Kumar,

Ramasamy & Stefanich, 2001), but most of the time during teaching-learning of science the focus is on sighted children. Stefanich and Norman, 1996 reported that visually impaired students could become chemists and Parry, Braizer and Fischbach, 1997 reported that these students can deal with physics course if provided with appropriate student support and faculty. The students with low vision experience difficulty in learning science through traditional methods (Koul, A 2015). In this paper focus is on how visually impaired students can learn science by doing activities as sighted children.

Methodology

Science activities can be performed by visually impaired student like any sighted student. In this paper various science activities have been highlighted which can be adapted for visually impaired students (NCERT, 2006). The facilitator should encourage group activities within and also outside the classroom. All the mentioned materials in the activities will be provided by the facilitator in a tray to make visually impaired students work comfortably.

It is advised that the facilitator may encourage the student to collect the tray and keep it on his/her working table. Facilitator may provide Braille slate to these students in advance to record the observations (Figure 1).



Figure 1: Using Braille slate for recording observations

How to adapt activities for visually impaired students

Some examples are given below:

Example 1:

Observe and understand how seeds germinate

Material required: Dry seeds of green gram or chickpeas (say 20 seeds), piece of cloth, water and steel/plastic container. All the material will be provided in a tray.

Motivate visually impaired students to follow the following steps:

Steps to be followed:

- Collect the tray containing materials from the facilitator and place it on your working table.
- Take some dry chickpeas and feel them by touching (Figure 2). For example: their texture, shape, hardness etc. and note down your observations.



Figure 2: Dry chickpeas

- Take a bowl and spread muslin cloth in the bowl in such a way that it covers the entire inner surface of the bowl.
- Pour water in the bowl and put these chickpeas in it. Touch and feel that seeds are completely dipped in water. Leave it undisturbed overnight.
- Next day, observe the soaked seeds. Check the texture, hardness, size and shape of the seeds, and note down the changes, if any.
- Lift the muslin cloth containing seeds and place it carefully in another bowl.
- Wrap the seeds in muslin cloth and keep them undisturbed for 2 to 5 days. Keep the muslin cloth moist by sprinkling water at regular intervals.
- After 3 to 5 days, feel these chickpeas again by touching (e.g., their texture, shape, hardness etc.) and note down your observations again.
- Can you feel any change in them?
- You may have felt a small structure grown out of the seeds (Figure 3). If yes, your seeds have germinated. If not, keep them aside for one more day.
- Compare your observations before and after germination of seeds.



Figure 3: Germination of chickpeas

Example 2:

Observe the germination of seed into a plant

Material required: Dry seeds of green gram or chickpeas, piece of cloth, water, container, used plastic bottle, soil, tactile ruler. All the material will be provided in a tray.

Encourage visually impaired students to follow the following steps:

Steps to be followed:

- Collect the tray containing materials from the facilitator and place it on your working table.
- Prepare the sprouts as shown in the Example 1.
- Take a used plastic bottle and cut it into two halves (caution: facilitator or partner may help in cutting the bottle). The lower half of the bottle is your container. Make a small hole at its base (Figure 4).



Figure 4: Used plastic bottle cut into two halves

- Place the soil in the lower half of the plastic bottle and moisten the soil by putting water in it.

- Remove a little soil from the surface and place a sprouted seed and cover it with the soil. Similarly, place a few more seeds in the bottle at a little distant from each other.
- Leave it undisturbed for few days. Keep the soil moist always.
- Keep touching the surface of the soil gently every day. After a few days, you can feel some soft material protruding out of the soil.
- Measure its length once a day for a week by using the Braille ruler and document it.

This is how these sprouted seeds will grow into small plants.

Example 3:

Classify materials as hard and soft

Material required: Stone, key, pencil, a piece of brick, sponge, cotton, fresh leaf and candle. All these objects will be provided in a tray.

Caution: The facilitator will make sure that the materials provided to the students will not have any sharp edges.

Steps to be followed:

- Collect the tray containing objects from the facilitator and place it on your working table.
- Take out the objects one by one from the tray and feel it by touching.
- Place the objects on the table and press them hard with your hand and also try to scratch them one by one.
- After pressing feel the change in the objects, if any. The objects which could be pressed and scratched easily are to be placed on left hand side. These are soft materials (Figure 5).
- The objects which are hard to press and cannot be scratched easily are to be placed on right hand side. These are called hard materials (Figure 6).



Figure 5: Easy- to- press object

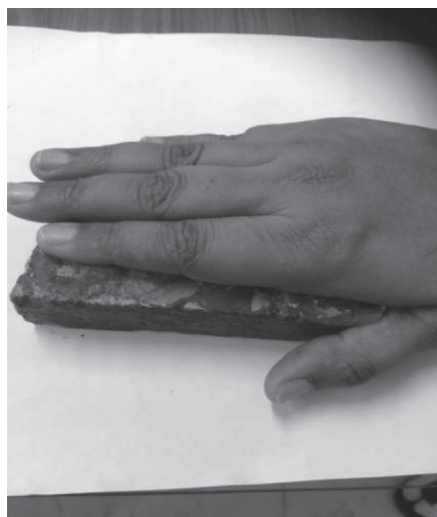


Figure 6: Hard- to- press object

The facilitator will disclose the name of the soft materials such as sponge, cotton, fresh leaf and candle and hard materials such as stone, key, pencil, a piece of brick once the students are through with the activity.

By performing this activity visually impaired students can classify materials as hard and soft. During group activity facilitator can encourage these students to feel and explore hard and soft materials from their surroundings like sighted students, but make sure that they can explore surroundings always in the presence of their facilitator or partner.

Example 4:

Classify materials as soluble and insoluble in water

Material required: 1gram each of sand, salt, chalk powder, sugar, sawdust will be provided in separate pouches, water in a container, plastic/ steel bowls, spoon, lid of used plastic bottles. All these materials will be provided in a tray.

Caution: The facilitator will make sure that no material will be tasted in this activity.

Steps to be followed:

- Collect the tray containing materials from the facilitator and place it on the table.
- Take plastic/ steel bowl and pour water in it. Use the lid of a plastic bottle to pour water in the bowl. Put water five times in the bowl with the help of plastic lid (Figure 7).



Figure 7: Pouring water using the plastic lid of a bottle

- Pick up one pouch containing material and put it in the bowl containing water.
- Swirl your hand inside the bowl. Try to feel the material present in the bowl (Figure 8). Wash your hands thoroughly.



Figure 8: Material present in water

- Now stir it by using a spoon at least for two minutes i.e. count from 1-60 twice.
- Feel what happened to the material added to water by swirling your hand in the bowl again. You may or may not feel the material. If you do not feel the material, this means material has completely dissolved in the water (Figure 9). If you feel the presence of the material this means material has not dissolved in the water even after stirring (Figure 10).



Figure 9: Material disappeared after stirring

- Repeat the above steps similarly with other materials also.
- Wash hands thoroughly after completing the activity.

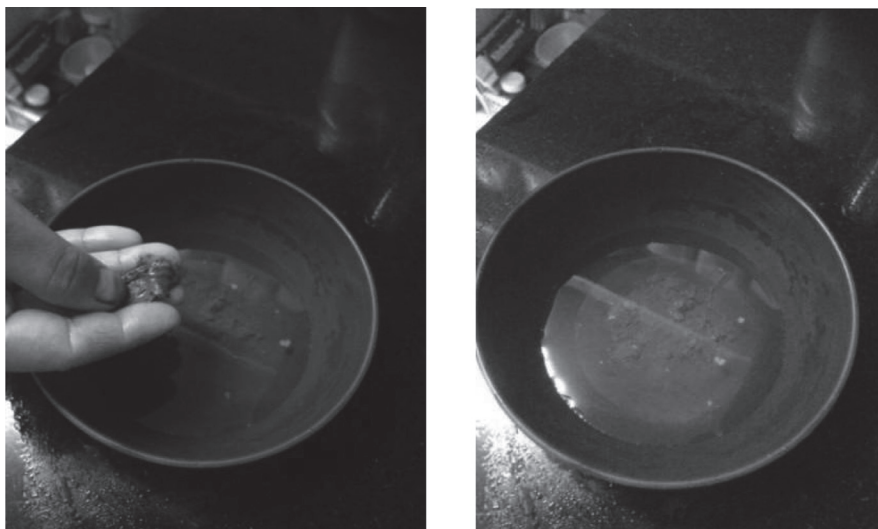


Figure 10: Material present in water even after stirring

Materials which will dissolve completely in water such as salt, sugar are called soluble substances and the materials which will not dissolve in water such as sand, chalk powder, saw dust are called insoluble substances. By performing this activity visually impaired students can classify materials as soluble and insoluble in water. The facilitator should disclose the names of the materials once students have classified them as soluble and insoluble materials in water.

Example 5:

Classify materials as sink or float in water

Material required: Small stone / pebble, leaf, key, coin, plastic/ steel bowl, water. All these materials will be provided in a tray.

Caution: Facilitator will make sure that no such material will be given to the students which have sharp edges.

Steps to be followed:

- Collect the tray containing materials from the facilitator and place it on the table.
- Take plastic/ steel bowl and fill it with water. You can swirl your hand inside the bowl and make sure that bowl contains only water.
- Take any object and place it on the surface of water containing in the bowl and wait for one minute i.e. count from 1 to 60.
- Touch the surface of water. If you feel the object still on the surface of water, this means the object floats in the water (Figure 11).
- If you do not feel object on the surface of water, then put your hand at the base of the bowl and find if the object has sunk to the bottom of the bowl (Figure 12).



Figure 11: Object at the surface of water



Figure 12: Object at the base of the container

- Repeat the above steps with other objects also.
- Classify objects that sank and floated in the water and note your observations.
- Wash hands after completing the activity.

The facilitator should communicate the objects that sank in water are stone, key and coin and the object which floated in water is leaf.

Example 6:

Explore and find out!

- The facilitator can provide a fruit to the students and ask them to find out what will happen to the fruit when placed in water before (Figure 13) and after peeling (Figure 14). The facilitator may encourage them to find out the reason behind it while having discussion with their classmates.

In this example, the students can make out that the given fruit is orange due to its smell.



Figure 13: Orange placed in water



Figure 14: Orange placed in water after peeling

- They can also be given a task to find out that what will happen to an egg when it is placed in fresh water and when placed in salted water?

Example 6:

Identify exothermic and endothermic reactions

Exothermic reaction:

Material required: 2 gram calcium oxide (quick lime) in a pouch, plastic container, lid of plastic bottle, water. All these materials will be provided in a tray

Steps to be followed:

Caution: The facilitator will make sure that water is to be added in calcium oxide slowly.

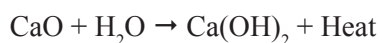
- Collect the tray containing materials from the facilitator and place it on the table.
- Take clean and dry plastic container and empty pouch of calcium oxide in it.
- Take water in a container and feel its temperature by touching. Note down your observations.
- Add this water to the container having calcium oxide carefully at least five times using plastic lid as shown in the above examples.
- Touch its outer wall again (Figure 15). Do you feel any change in the temperature? Do not put your finger or hand inside the container. Also, try to hear the sound produced, if any.



Figure 15: Touching the wall of the container having solution of calcium hydroxide

- You can record the change in temperature before and after adding water to calcium oxide.
- Wash your hands after doing the activity.

The facilitator should explain that calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide), releasing a large amount of heat. The reactions in which heat is released along with the formation of products are called exothermic reactions.



Endothermic reaction:

Material required: 2 gram barium hydroxide in a pouch, 1 gram ammonium chloride in another pouch, plastic container, and stirrer. All the material will be provided in a tray

Steps to be followed:

- Collect the tray containing materials from the facilitator.
- Take the pouches containing barium hydroxide, ammonium chloride and feel their temperature by touching. Note down your observations.
- Take plastic container and empty the pouches of barium hydroxide and ammonium chloride one by one in it.
- Stir the mixture using stirrer/spatula at least for two minute i.e. count from 1 to 60 twice (Figure 16).



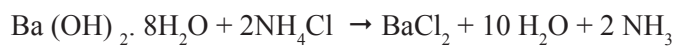
Figure 16: Mixing barium hydroxide and ammonium chloride

- Touch the wall of the container from outside and feel its temperature (Figure 17). Note down your observations before and after the reaction.
- Waft the vapours gently towards your nose and note down your observations again. Never smell the vapours directly.
- Wash your hands after doing the activity.



Figure17: Touching wall of the container having reaction mixture

The facilitator should explain that barium hydroxide reacts with ammonium chloride to produce barium chloride, water and ammonia. The reaction mixture gets cold. The reactions in which energy is absorbed are called endothermic reactions.



The examples discussed above are some exemplar activities. Most of the activities given in the textbooks can be performed by visually impaired students but of course with a few modifications.

To accommodate students with visual impairment in science classrooms, the school administration and teachers need to consider some suggestions to make science teaching joyful for visually impaired students.

Following are the suggestions for teachers and school administration to make learning feasible for visually impaired students.

- Always speak to student directly. Discuss with him/her with patience.
- The textbooks and other supplementary material should be translated in Braille. Provide tactile diagrams, which will help them for better understanding of the concepts.



Figure 18: Tactile diagram to show solubility of material in water

- The print material should be of large font size and also while writing on the black board, write bigger font size. This will be useful for low vision students.
- Try to audiotape lectures so that these students can hear them after school hours at their own pace, if by chance could not follow the lecture in the classroom.
- If possible provide a partner who will help him / her during activities. Partner should be such who is willing to work patiently with such students.
- Use real material/objects from the surroundings, so that they can feel them by touching and smelling. Remember; never allow them to smell any chemical or gas directly. Always ask them to waft the vapours towards their nose. They will gain self- confidence by exploring surroundings but of course under the guidance of facilitator or partner.
- Always use three-dimensional (3D) models for small objects.

- While working in activity room, these students must be oriented with emergency exit, chemicals, glass apparatus, equipments, heating device, placement of sink, water taps etc. As far as possible, use unbreakable apparatus instead of glass.
- Always use Braille labels on chemicals, reagents, glassware, equipments etc.
- Encourage visually impaired to take the help of a sighted buddy or facilitator when an experiment involves burning of anything. The most common heating device which can be used at this stage is spirit lamp. For safety measures particularly for low vision the use of tripod stand and wire gauze is recommended. The use of tripod stand around the spirit lamp provides extra protection around the spirit lamp and wire gauze identifies the position of the flame because it glows brightly. Long handled match sticks should be used to keep the student's hand away from the flame. Always provide a bowl containing water in the tray while working with heating device. If student by mistake touches any hot container can dip his/her fingers in the bowl of water as a first aid.
- Provide computers and Braille measuring devices.
- Ensure that they must wash their hands after completing the activity and never taste any material unless asked for.
- Encourage them to work in group activities. Make sure that each task should be followed by discussion. Ensure that these students share their observations and experiences.
- Make sure that doors of classrooms and activity room are either fully open or fully shut. Doors should not be left half open.

Conclusion

As a researcher, we feel that it is necessary to modify the activities to make classrooms inclusive in nature. Other resource materials such as tactile charts, tactile graphs, tactile figures, 3 D models etc., may be used more to make visually impaired students understand science better. Group discussions should be encouraged while working. Every student in the class should be given chance to address his/ her own ideas. This will facilitate learning in inclusive classrooms.

It is hoped that the methodology described in this paper will motivate science teachers to adapt the activities given in science textbooks and encourage visually impaired students to learn science not only by lecture method but by hands-on. Blindness is just a physical disability and not an intellectual one. Ultimately, the message is *"One does not need to be sighted to understand and pursue a career in Science."*

"Alone we can do so little; together we can do so much"

Helen Keller

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Enhancing Academic Performance in Mathematics of Grade 11 Students through Pre-Recorded Lesson and Home Tutorial Session

Neilkim-Peter J. Tapado

Abstract

Purpose. The main objective of the study is to find out if there is a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions. This study also wants to determine its implications for the students.

Design/Methodology/Approach. The study employed descriptive research utilizing a quantitative approach through the comparative method to determine if there is a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions. The respondents to the study were the 32 Grade 11 students at Jomalig National High School who took the General Academic Strand (GAS). The respondents were chosen purposefully.

Findings. The findings of the study revealed that there were notable and significant differences between the pre-test and post-test scores of the students involved in the interventions. The pre-test and post-test data revealed a mean of 12.25 and 26.5312, respectively. The data also revealed a computed t-value of 24.52165006 and a p-value of 3.66137E-22 at the 0.05 level of significance, which shows that there is a significant difference in the pre-test and post-test scores of the students while giving the pre-recorded lesson and home tutorial session. Consequently, giving pre-recorded lessons and home tutorial sessions had a massive effect on the academic performance in mathematics of grade 11 students. Thus, giving a pre-recorded lesson and a home tutorial session enhanced the academic performance of grade 11 students in mathematics.

Originality/Value. This research provided significant data on the impact of pre-recorded lessons and home tutorial sessions on the academic performance of Grade 11 students. This also revealed a significant difference between their performances through pre-recorded lessons and home tutorial sessions before and after the implementation of the interventions.

Key Words: Academic performance, Pre-recorded lesson, Home tutorial

Introduction

The COVID-19 pandemic presented unusual problems to all parties involved, including teachers, parents, and most importantly, students. When using the modular learning style in mathematics, the new normal education approach had a considerable impact on student performance. The study by Bibon and Barcnas (2021) states that some problems encountered in modular distance learning include support systems, which

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revealed that their immediate family support system could not aid in their academic needs. Indeed, parents or guardians were essential workers in the modular learning modality. However, they were short on time when it came to assisting children with their homework at home. Maybe they were too focused on their work and lacked the knowledge and abilities to aid students in their study of mathematics. According to the study of Gueta and Janer (2021), many students struggled the most with learning properly and succeeding in school under the new normal circumstances and now find it tough in some cases. The majority of students were having problems understanding the modules and other subjects, particularly math. Some students complained that most mathematics problems were tough to solve and that no thorough explanations were offered. Calculation alone was not sufficient to solve a problem; the issues also needed to be fully understood and analyzed.

Based on the aforementioned feedback, teachers should take appropriate action. The use of a self-learning mathematics module by students should be encouraged. The Department of Education issued Regional Memorandum No. 393 s. 2020, which stated that in order to provide assistance or remediation for students who do not have access to learning facilitators at home, the subject teacher or a cluster learning facilitator may conduct a home visitation in accordance with social distancing protocols or conduct communication through text messages, phone calls, live chats, or other available forms of communication. In addition, other learning textbooks, learners' materials, MELCs-aligned teacher-made videos, audio lesson modules, activity sheets, and interactive electronic materials may supplement the required learning resource for each learning modality. Meanwhile, the Department of Education, No. 32 s. 2020, stated that learning support must be prioritized for communities or barangay schools with a higher number of learners or households. Priority in the deployment of learning support aides will be given to learners who are unable to manage independent learning, including those with disabilities and special needs, as well as households without any available family members or responsible adults who can support the child's distance learning. It is supported by the study of the Center for Education Statistics and Evaluation (2015), which revealed that one approach to addressing the disparity in student outcomes is through the implementation of remedial tutoring programs aimed specifically at improving the school performance of disadvantaged students. Consequently, the lessons from the self-learning module will be obtainable to students. Students truly need the assistance of the teachers in each lesson in mathematics for the self-learning module, as can be seen in the aforementioned statement above. These actions will guarantee that teachers impart the appropriate knowledge needed for students to learn the lessons in mathematics. However, students at Jomalig National High School are now performing poorly in mathematics. They rarely provided an output for the subject, and when they did, no response was provided. Consequently, as a researcher, it is vital to determine if there is a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions. Thus, the researcher is eager and motivated to find out the result of this study.

Research Questions

The study sought to answer the following questions

1. What is the pre-test result of students before giving a pre-recorded lesson and a home tutorial session?
2. What is the post-test result of students after a pre-recorded lesson and a home tutorial session?

3. Is there a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions?
4. What is the implication of the results in the teaching and learning process in this time of pandemic?

Hypothesis

Ho: There is no significant difference in the pre-test and post-test results of the students before and after giving a pre-recorded lesson and a home tutorial session.

Brief Review of Related Literature and Studies

Academic Performance in Mathematics

Odiri (2015) argued that in terms of the quality of mathematics education and student performance, learning habits play an important role. It is the partnership between the classroom and out-of-class learning that creates learning habits for students. Ebele and Olofu (2017) added that the way students organize their studies determines their grades. It is the level of preparation and strategy that students develop and use that influences subject proficiency. In fact, Sakirudeen and Sanni (2017) found that learning habits such as taking notes, using the library, and managing time affect the academic performance of the students. They also recommended that group counseling initiated by professional counselors be organized in schools to raise awareness of practical learning habits and provide a functional library in secondary school. In light of the study undertaken, watching pre-recorded lessons may be one of the learning habits adopted by the students because, through this, students may have an assurance of learning a specific lesson. For instance, in Mathematics. Thus, students may perform better academically in Mathematics.

Furthermore, attitude is another factor that primarily predicts student performance in Mathematics. A study conducted at Stanford University found that a positive attitude towards Mathematics accelerates brain memory and predicts Mathematics performance (Chen et al., 2018). Karjanto (2017) found that there was a significant positive correlation between Mathematics grades and the positive attitude of the students towards Mathematics. The willingness of the students to learn and the benefits to bring to their Math lessons are affected by these positive attitudes (Atanasova-Pacemska et al., 2015). In light of the study undertaken, giving pre-recorded lessons and home tutorials by the teachers may affect the attitude of the students. Through this, students may have a positive attitude towards learning, for instance, Mathematics, since teachers guide them well. Consequently, the academic performance of the students in Mathematics may be better.

Moreover, Hatties (2017) updated the list of factors that influence student performance. These factors include those that teachers, principals, students, or parents can control or influence, and the corresponding impact values for each factor. Despite determining the effect size of each factor, no studies have been recorded to integrate the interactions or combinations of these hierarchical factors in the mathematical performance of the Philippines, especially Mindanao. In light of the study undertaken, the teacher is one of the factors that influence the performance of the students. Students can learn Mathematics if the teacher delivers a pre-recorded lesson and conducts home tutorials with them. Thus, the academic performance of the students may be better.

Meanwhile, the Philippines ranks second among the participating countries in the latest Program for International Student Assessment (PISA) 2018, according to the Philippine Department of Education

National Report (2019). This amazing result shows that Filipino students scored an average of 353 points. In light of the study undertaken, by giving pre-recorded lessons and home tutorials by the teachers, students may perform better while continuing their education. Consequently, the Philippines may have a good rank again in PISA.

However, in math literacy, it is well below the Organization for Economic Cooperation and Development (OECD) average of 489 points. In fact, according to Macha, Mackie, and Magaziner (2018), the Philippines ranked only 34th place in the study of Trends in International Mathematics and Science Study (TIMSS). Furthermore, it is also reported that one in five high school students in the Philippines, or about 19.7%, has reached the lowest level of mathematics (level 2). In light of the study undertaken, the rank of the Philippines in TIMSS will be higher than the 34th place, and in math literacy, students may have a higher average score in the OECD, if pre-recorded lessons and home tutorials are given to the students by the teachers. The pre-recorded lesson and home tutorial may promote convenience for students to learn since teachers assure that the lessons presented are easy to understand by the students. Consequently, students may perform better in Mathematics through pre-recorded lessons and home tutorials.

Role of Teachers in the Academic Success of the Students

Lynch (2019) discovered that teachers play an integral role in the academic success of all children they teach. For learners who are facing academic failure/or whose academic potential is low, it is vital that they play an even more dominant role. Indeed, this is not an easy task in a classroom full of other students who need the help and guidance of a teacher. An additional challenge for many teachers is how to effectively deal with differences in student culture and socio-economic status. Such differences can include learning, social style, and communication skills, and the gaps that can occur between teachers and students can be frustrating and even overwhelming. However, with the right support from colleagues and administrators, teachers can greatly increase their chances of reaching their students, which in turn increases their chances of success in their studies. In light of the study undertaken, pre-recorded and home tutorial, teachers may be able to play their role in the academic success of the students. Pre-recorded lessons and home tutorials may meet students' needs in understanding specific lessons, such as Mathematics. Despite the different intellectual capabilities of students, pre-recorded lessons and home tutorials may provide the students' needs in learning. These may be appropriate for individual differences. Consequently, academic success in Mathematics among students may be possible. Thus, the role of teachers in the academic success of students may be observed through pre-recorded and home tutorials.

Furthermore, according to Moustafa et al. (2013), the role of teachers in constructivist classes is to promote and embrace student autonomy and create a comfortable atmosphere for students to represent people who act as student guideposts. In light of the study undertaken, giving pre-recorded lessons by the teachers to the students may promote autonomy and create a comfortable atmosphere for them since students may understand the lesson on their own somehow. They may have the chance to be independent learners since students may watch it at their convenience and understand it on their own.

Moreover, Tamim and Grant (2013), enhancer, extender, initiator, and navigator are the four roles of teachers identified. For example, teachers need to take over or take over the role of moderator and education manager in different types of student-centered classes. Keiler (2018) also explained to students the role and identity of

teachers. In light of the study undertaken, pre-corded lesson, and home tutorial, teachers may be able to show the roles of becoming an enhancer, extender, initiator, and navigator. Consequently, Sin (2019) points out that having a teacher in a student's life can boost student morale and make it more valuable in life. In light of the study undertaken, the pre-recorded lesson and home tutorial may have a positive effect on the academic performance of the students. Thus, it may boost student morale and make this more valuable in their lives.

The Relevant Learning Modalities for Students

According to a report by Malipot (2020), the Department of Education (DepEd) is currently conducting distance learning at the basic education level. Students can choose from several learning modalities, including modular (printing or digitizing), online learning, radio, and television-based lessons, and combination (blended learning). According to Dep. Ed, of all the options for teaching content, printed modules were the preferred choice for students and parents. However, due to the high cost and negative environmental effects of printed self-learning modules, Secretary of Education Leonor Briones claimed that this option is not very sustainable. Cabual (2021) showed the preferred learning modality was the self-learning module (module printout) and achieved the highest percentage at 66.67 percent. In most of the schools' preferred modular learning modality, students are more responsible for learning, and in light of the study undertaken, pre-recorded lessons and home tutorials may be given by the teachers to assist students in learning.

The Importance of Pre-Recorded Lessons

According to a report by Malipot (2020), the Department of Education (DepEd) is currently conducting distance learning at the basic education level. Students can choose from several learning modalities, including modular (printing or digitizing), online learning, radio, and television-based lessons, and combination (blended learning). According to DepEd, of all the options for teaching content, printed modules were the preferred choice for students and parents. However, due to the high cost and negative environmental effects of printed self-learning modules, Secretary of Education Leonor Briones claimed that this option is not very sustainable. Cabual (2021) showed the preferred learning modality was the self-learning module (module printout) and achieved the highest percentage at 66.67 percent. In most of the schools' preferred modular learning modality, students are more responsible for learning, and in light of the study undertaken, pre-recorded lessons and home tutorials may be given by the teachers to assist students in learning.

Kyaw (2021) found that pre-recorded videos usually improve student learning, according to a study recently published in the American Educational Research Association (AERA) peer-review journal *Review of Educational Research*. This study analyzed 105 past randomized studies involving a total of 7,776 students and compared the effects of video on learning with those of other educational media, including face-to-face lectures and assigned readings. As a result, using video instead of other teaching methods slightly improved student learning, and using video on top of other teaching methods showed greater improvement. According to research, a video was more suitable for giving skills than knowledge. In light of the study undertaken, pre-recorded videos are one of the pre-recorded lessons. Whatever pre-recorded lesson it is, it may assist students in learning. There is a high possibility that pre-recorded lessons may improve learning among students. Besides, using pre-recorded lessons may serve as the most effective way of teaching. Thus, students may have better academic performance overall.

Furthermore, Sinha et al. (2014) stated that watching video lectures in a large electronic learning course proved to be the main activity of the learner. Video Lectures provide different system interaction capabilities to complement content transmitted through different formats of both auditory and visual media (Alraimi et al., 2015). Media usage can be the most prominent aspect of video lectures. This is because it allows most forms of education and learner interaction in which electronic learning cannot exist. In light of the study undertaken, the pre-recorded lesson may be viewed by the students at their convenient time. Because both auditory and visual input was used, it may provide different system interaction capabilities. It also contributes to how students perceive the lecture and ultimately how cognitive process information is communicated to them (Mayer, 2014). In light of the study undertaken, the pre-recorded lesson may contribute to the lectures of the lesson, and students may be able to grasp the information. The use of media applications in video lectures enables students to process the information they have received both visually and audibly. This process is done by organizing the information in working memory and transferring it to long-term memory. In theory, this ought to result in a bigger schema and, in the end, a better comprehension of the content (Mayer, 2014). In light of the study undertaken, pre-recorded lessons may provide the students with the needed information to understand specific lessons.

Moreover, various forms of visual media designed to raise student awareness and involvement during video lectures include illustrations, images, graphics, maps, animations, videos, slides, and texts (Kizilcec et al., 2015). Pre-recorded lesson may have different visual media such illustrations, images and other visual media. Auditory media are designed to encourage student involvement through forms such as music, sound effects, spoken language, teacher voices, and narration (Mayer, 2014). In light of the study undertaken, pre-recorded lessons may also have different auditory media, such as music, sound effects, and other auditory media. In addition, effective delivery of auditory media provides linguistic information that learners can process efficiently, emphasizes such information, and draws the attention of the learners through non-verbal sounds and music (Costley & Lange, 2017). In light of the study undertaken, the pre-recorded lesson may provide linguistic information and may have non-verbal sounds and music to ensure learning occurs among students. Therefore, using visual and auditory media in video lectures has obvious benefits. Online teachers need to consider potential issues with inefficient media delivery.

However, information transfer problems arise when the media is communicated in a way that limits concentration, attention, interest, involvement (Curry, n.d.) and overloads working memory (Mayer, 2014). In light of the study undertaken, the pre-recorded lesson may have problems in providing information if it consists of unnecessary content. The use of ineffective media is said to contribute to interest, involvement, and motivational issues, and ultimately to a lack of understanding in the electronic learning environment (Costley & Lange, 2017). In light of the study undertaken, the pre-recorded lesson may be ineffective if not properly created. For instance, the negative impact on learning results from either a loss of concentration on the content or a problem associated with trying to process the content (Molnar, 2017). Thus, pre-recorded lesson may be insufficient in learning by the students.

Home Tutoring: Benefits and Challenges

(Bento & Ribeiro, 2013) stated that all parents in Malaysia have a common goal for their children. It is about ensuring that children get the best grades in the school curriculum. Parents actively invest in out-of-school educational activities to improve the school performance of their children. In light of the study undertaken,

home tutorial may be considered by parents to have a better academic performance for their children. In fact, home tutoring is the best option for private complementary educational activities to improve the educational performance of the children (Rahim et al., 2020).

Rahim et al. (2020) listed several advantages of home tutoring, including individualized attention, improved communication skills, increased focus and relaxation, direct observation, and convenience. In light of the study undertaken, students may have a better academic performance when home tutorial is being done. However, the study of Walker (2017) stated the challenges of home tutoring, such as lack of motivation, stress and anxiety, bad behavior, laziness, problems in acquiring new knowledge, and pressured parents. In light of the study undertaken, these may be the reasons why home tutorials among students may have a negative effect on the academic performance of the students. Thus, home tutorials by the teachers may have benefits and challenges.

Scope and Limitations

The main purpose of the study is to determine whether a pre-recorded lesson and a home tutorial session as interventions by the teachers increase the academic performance in mathematics of grade 11 students. The specific objectives of the study are to:

1. Determine the pre-test results of students before giving pre-recorded lessons and home tutorial sessions.
2. Determine the post-test results of students after giving pre-recorded lessons and home tutorial sessions.
3. Evaluate and analyse if there is a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions?
4. Determine the implications of the results on the learning process of the students.

Methodology

The study employed descriptive research utilizing a quantitative approach through the comparative method to determine if there was a significant difference between the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions. In fact, the school included in this study was Jomalig National High School, located in Brgy. Talisoy, Jomalig, Quezon. This institution provided only a senior high school (SHS) in Jomalig, Quezon, where the respondents in this study were grade 11 students, specifically students who enrolled in the General Academic Strand (GAS). The respondents of the study were the 32 Grade 11 students of Jomalig National High School who took General Academic Strand (GAS) during the first semester of the school year 2021–2022. In fact, there were two sections at Jomalig National High School that were currently taking GAS. However, only one section was chosen by the researcher for this study. Thus, the respondents were chosen purposefully.

Parental consent was requested by the researcher from the parents of the respondents. Then, the researcher sent a request for a consent letter and approval to the district supervisor. In fact, a duplicate of the signed letter was forwarded to the Division of Quezon Office for final approval by the Division Superintendent. All of this was done by following safety protocols.

For conducting the pre-test and post-test of this study, the researcher prepared a draft of the test as a research instrument and as the primary source of information. Two lessons were covered in the pre-test and post-test exams in accordance with the most essential learning competencies. The instruments went through content validation by the Public Schools Division Supervisor of the Jomalig district, Dr. Sharon A. Villaverde. Another validator was a doctoral student who was currently studying at the Manuel S. Enverga University Foundation named Maam Earludgin B. Torrente. The instrument was revised to improve the content, and the result was valid and reliable before the administration of the instrument. Suggestions, corrections, and comments from the adviser were taken into consideration in making the final draft of the instrument. Moreover, the research instruments underwent pilot testing and reliability testing to be more credible. Grade 12 students studying at Jomalig National High School were involved in the pilot testing. Using split-half analysis, the correlation coefficient was high, which means high reliability. Thus, after the validation of the instruments, pilot testing, and reliability testing, the instruments were used in the study.

The researcher went to the place of the respondents to get permission from the barangay chairman to conduct the study formally and legally. After the approval of the permission, the researcher conducted the pre-test exam in a limited face-to-face setting, following the safety protocols. Then, after the pre-test exam, the researcher gave the pre-recorded lesson as one of the interventions. One week after the pre-test examination, a home tutorial session followed to continue the interventions. Afterward, a post-test exam was conducted through limited face-to-face contact, again following the safety protocols. In fact, limited face-to-face interaction in conducting the pre-test and post-test avoided cheating among the respondents since the researcher was present in the activity. Thus, the result was valid and reliable.

The researcher was eager to determine if there was a significant difference in the pre-test and post-test results of the students before and after giving pre-recorded lessons and home tutorial sessions.

Results and Discussion

The findings of the study revealed that there were notable and significant differences between the pre-test and post-test scores of the students involved in the interventions. The pre-test and post-test data revealed a mean of 12.25 and 26.5312, respectively. The data also revealed a computed t-value of 24.52165006 and a p-value of 3.66137E-22 at the 0.05 level of significance, which shows that there is a significant difference in the pre-test and post-test scores of the students while giving the pre-recorded lesson and home tutorial session. Consequently, giving pre-recorded lessons and home tutorial sessions had a massive effect on the academic performance in mathematics of grade 11 students. Thus, giving a pre-recorded lesson and a home tutorial session enhanced the academic performance of grade 11 students in mathematics.

t-Test: Paired Two Sample for Means		
	Pre-Test Scores	Post-Test Scores
Mean	12.25	26.53125
Variance	12.38709677	5.998991935
Observations	32	32
Pearson Correlation	0.436889182	

Hypothesized Mean Difference	0	
df	31	
t Stat	-24.52165006	
P(T<=t) one-tail	3.66137E-22	
t Critical one-tail	1.695518783	
P(T<=t) two-tail	7.32274E-22	
t Critical two-tail	2.039513446	

Conclusions

Based from the findings, the following conclusions were derived:

1. Students learn better during pre-recorded lessons and home tutorial sessions.
2. The home tutorial sessions for the students must always consider the safety protocols during a pandemic.
3. A pre-recorded lesson must always be provided in conjunction with a home tutorial session.
4. Activities for the students that involve parents promote harmonious relationships that have a positive effect on students learning and skill development.

Recommendations

Based on the findings and research conclusions, this study proposed the following recommendations:

1. Students may give more time to watching pre-recorded lessons and take seriously the home tutorial sessions given by the teachers.
2. Teachers may be completely committed, focused, and resolute to their responsibilities, especially in giving interventions such as pre-recorded lessons and home tutorial sessions, in order to meet the demands of students, especially during this pandemic.
3. Teachers may constantly ensure that students learn a certain lesson in various areas through various interventions, such as pre-recorded and home tutorial sessions.
4. To achieve a harmonious relationship with parents, teachers may take seriously the home tutorial sessions with students that have a positive effect on learning.

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Assessment of Academic Achievement of the Grade 11 Students in General Mathematics

Raymond D. Garcia

Abstract

The study was conducted to determine the Academic Achievement of Grade 11 Students in General Mathematics in the Public High Schools of Apayao during the school year 2016 – 2017.

32 of the 54 students in the GAS track senior high school of School A; 32 students in the GAS track senior high school of School B; and 32 of the 39 students in the GAS track senior high school of School C were included as the respondents of the study.

The 60-item teacher made test was used both in the pretest and posttest. An unstructured questionnaire which collected data on the beliefs of teachers' and students about assessment and its purposes was used.

The descriptive research design was employed in order to describe, record, analyze and interpret the academic achievement of Grade 11 students in General Mathematics. A one-group pre-test and post-test design was used in this study to measure progress of student during the three-week study duration.

Box-plots were used to present graphically the academic performance of the Grade 11 students in General Mathematics.

The frequency scores of the Grade 11 students improved after the interventions were given by the teachers.

The result of the study confirmed the need to really implement the policy guidelines on classroom assessment for the K-12 Basic Education Program stipulated in Dep-Ed order No. 8, series of 2015.

Teachers are encouraged to attend seminars and trainings on teaching strategies and interventions to improve their teaching methods.

For future research, it is recommended that similar investigations be conducted in order to determine the validity of the findings through a comparative study in the different grade 11 high schools

Rationale

Educators have searched for ways to a more effective way of teaching mathematics to all students. Math education enables learners to meet society demands for a competent and flexible work force (Niss, 1996). Mathematics improvement is at the core of educational strategy all over the world, but in the Philippines, teachers and learners still face with problem regarding poor achievements in general mathematics, more particularly in the Senior High School curriculum.

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General Mathematics is a core subject in the Senior High School curriculum. Students are expected to learn to utilize analytical reasoning skills to solve problems involving functions and their graphs and applications. Despite various attempts by educators to remedy poor academic performance in Mathematics as a whole, students continue to struggle with the fundamentals of mathematical reasoning and problem solving (Mayfield & Chase, 2002), and thus global underachievement from students in this subject area persists (Mbugua, et al., 2012).

Since teacher quality is an important factor in determining the academic performance of students (Metcalf, 2008), then, their responsiveness to the needs of the students would also play a major role in the students' learning and achievement. Effective pedagogy would encompass a teacher's adaptability to the needs and progress of each individual student to help them achieve the target learning outcomes (Siyepu, 2013; Christmas, Kudzai, & Josiah, 2013).

The use of formative assessments as an instructional strategy has recently risen in widespread recognition and implementation to enhance student learning and achievement in various subject areas (Brookhart, 2007; Magno & Lizada, 2015; Wiliam, 1999; Yorke, 2003). Formative assessments enable teachers to gauge their students' current capabilities, measured against learning objectives (Clark, 2012), and to refine their instruction based on such feedback and observations (Cauley & McMillan, 2010).

With this belief, this study was conducted to determine the impact of formative assessments in increasing the achievement grades and learning gains of Grade 11 students in the General Mathematics. This research was based on the premise that giving formative assessments would lead to an improvement in terms of grades using formative assessments as supplemental activities that would facilitate learning, retention and mastery of the subject matter, thereby improving student performance and increasing Mathematics achievement.

Analysis of the Problem

This study used the descriptive research design, a method of educational research used to describe, record, analyze and interpret the academic achievement of Grade 11 students in General Mathematics. One-group pre-test and post-test design was used in this study to measure progress of student from the start to end of the three-week study duration. A total of 96 Grade 11 students from 3 high schools in Luna, Apayao were selected as respondents to this study.

A group of 32 from a total of 54 students enrolled in the GAS track senior high school of School A; 32 students enrolled in the GAS track of School B; and 32 out of 39 students enrolled in the GAS track of School C were included as respondents of the study.

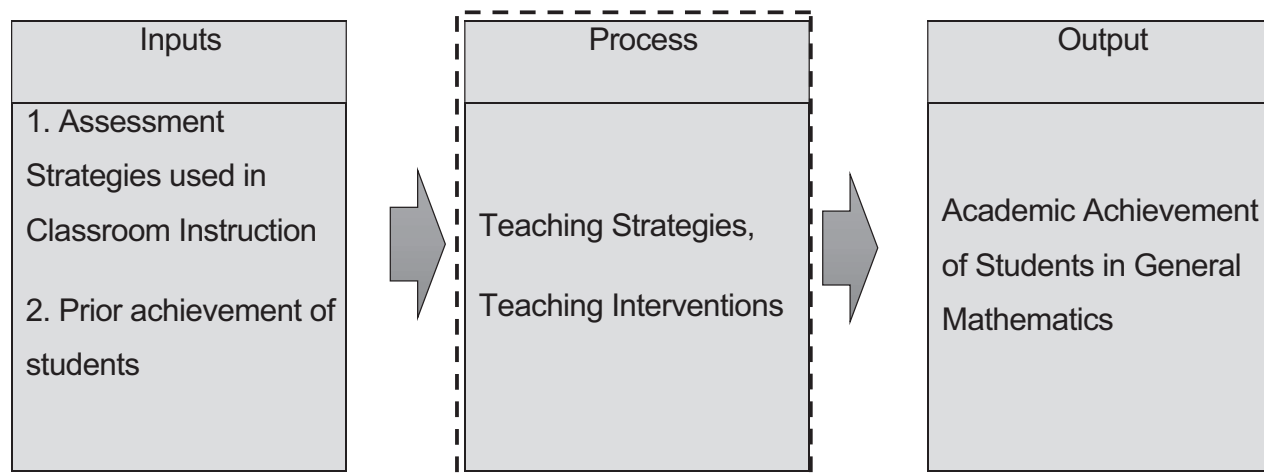
Pre-achievement data was gathered at the beginning of the study period using the teacher made test. Afterwhich, a set of teacher assessment interventions were conducted by the subject teacher. At the end of three weeks, the post-test was administered. In addition, students were interviewed.

The data gathered was analyzed using some statistical tools such as means and percentages. The t – test for paired samples was used to summarize and analyze the academic achievement of Grade 11 students.

Box-plots were also used to present graphically the per school performance of the respondents.

Conceptual Framework

The diagram below presents the summary of the Conceptual Framework showing how the Formative Assessments may affect the Academic Achievement of Student



The Conceptual Framework

Objectives

This study aimed to determine the academic achievement of Grade 11 students in general mathematics in the three (3) selected Public Schools of Luna, Apayao.

Specifically, it sought answers to the following questions:

1. What is the level of academic achievement of Grade 11 students in general mathematics in the three (3) schools before the use of assessments?
2. What is the level of academic achievement of Grade 11 students in general mathematics after assessments were used?
3. Is there a significant difference in the level of academic achievement of Grade 11 students in general mathematics before and after the use of assessments?
4. What are the teachers' and students' beliefs about assessment and its purposes?

Research Instrument

The descriptive survey method was used in this study using a questionnaire and interview guide as instruments. The questionnaire consists of 60 - item teacher made test to measure the achievement of students in General Mathematics. The interview guide consists of set of preliminary interview questions to guide the interview process. Guide questions as interview guide was also used to further gather data on the beliefs of teachers and students about assessments and their purposes.

Data Gathering Procedure

Pre-achievement data was gathered at the beginning of the study period using the teacher made test. After which, a set of teacher assessment interventions were conducted by the subject teacher. At the end of three weeks, the post-test was administered and students were interviewed.

Data Analysis Procedure

The data gathered was analyzed through the use some statistical tools such as means and percentages. The t – test for paired samples was used to summarize and analyze the academic achievement of Grade 11 student respondents.

Box-plots were also used to present graphically the per school performance of the respondents.

Results and Discussion

Observe in figure 2 that the scores of the students after the use of assessment in the classroom instruction improved. *It is obvious that the mean score of 22.44 is greater than the second quarter score of 21.* Score increase is similar to the results of Wang, Martin, Lambert, and Pugalee (nd) wherein the development of students' mathematical abilities observed in terms of monthly growth was influenced by the number of formative assessments administered in that particular set-up.

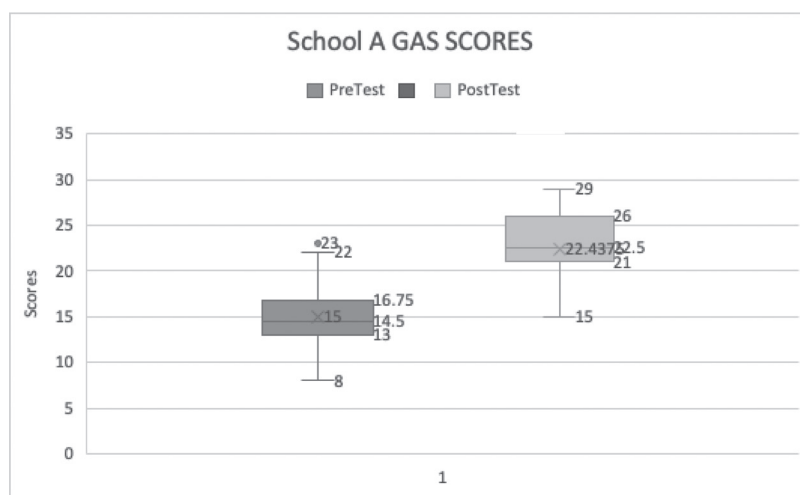


Figure 2. Pretest and Posttest Scores of School A – GAS Students

A significant increase in the posttest scores of the students can be gleaned in figure 3 which show that the computed second quartile of 26.5 in the posttest is greater than the mean which is 25.875.

This result was attributed to the concept of scaffolding as proposed by Christmas, Kudzai and Josiah (2013) as an operationalization of the Zone of Proximal Development theory indicating that additional practice would equate to improved resulting grades (Mayfield and Chase, 2002; McKeown, Beck, Omanson, and Perfetti, 1983) hence, providing students with more formative assessments would facilitate progress towards

the learning objectives and standards through developing their current capabilities (Heritage, 2010; Taras, 2005).

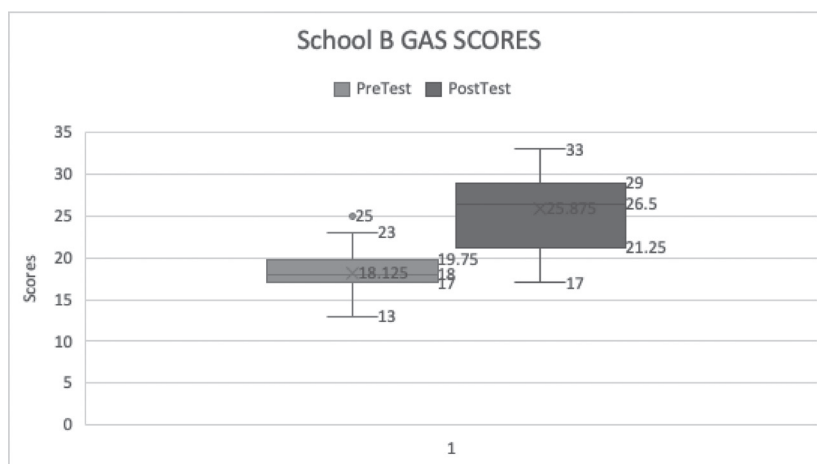


Figure 3. Pretest and Posttest Scores of School B – GAS Students

The chart below revealed big difference on the students' scores, although the second quartile in both the pretest (18.1875) and posttest (25.5313) scores is lower than the median (20 and 28.75, respectively).

This result corresponds with the notion that beyond teacher quality or mere subject content knowledge, teacher must also employ the proper and appropriate instructional strategies and tools to enhance student learning and achievement (Siyepu, 2013).

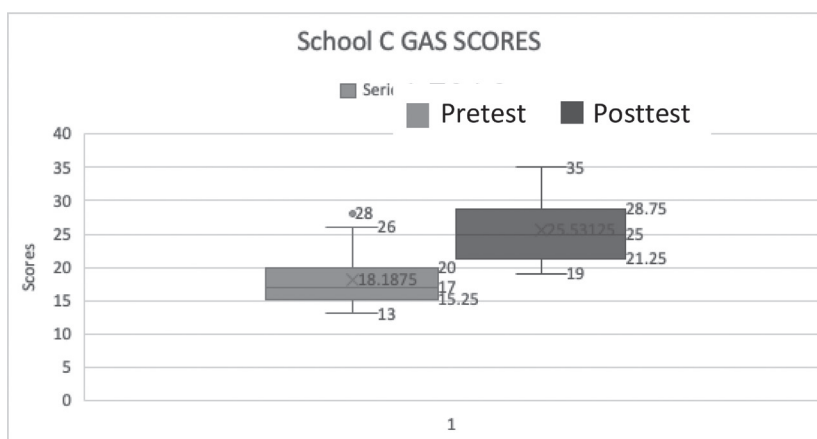


Figure 4. Pretest and Posttest Scores of School C – GAS Students

Obviously, only School C exhibits a second quartile score which is higher than the median in the students' pretest scores. *It can be seen that the second quarter scores in the pre – test is 18.1875 while the median is 17.* However, the other two schools signify a little difference between the second quartile and median.

This finding was supported by the study of Christmas, Kudzai, and Josiah, (2013) which emphasized the teacher's important role as the guide or expert person whom the student would rely on for help to increase

competence and achieve the functions within his/her zone of proximal development. This indicates the teacher's responsibility to be responsive to the needs of the students on providing proper and adequate support (Donato, 1994), including upgrading the scaffolding provided or removing such depending on whether the student requires more or less assistance (Rogoff, 1990).

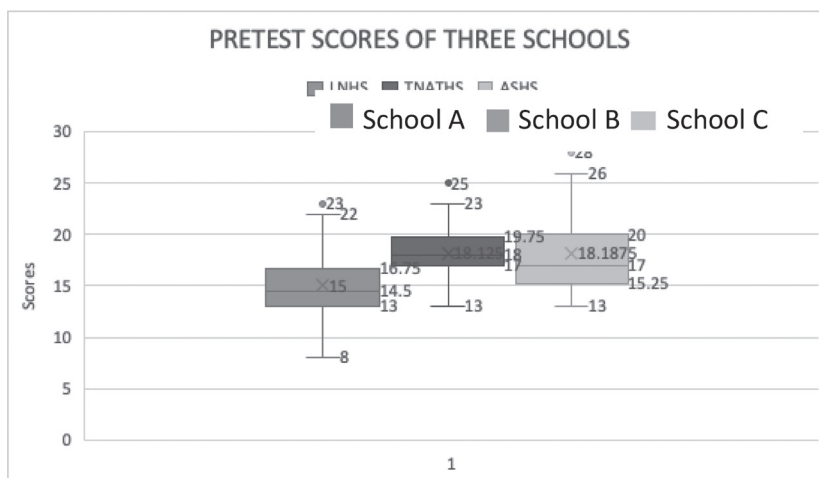


Figure 5. Comparison of the Pretest Scores of Three Schools

In the posttest, School C revealed the highest score compared to School B and School A. However, only School B obtained a second quartile score (26.5) that is greater than the median (25.875).

The study of Andrade, Lui, Palma, & Hefferen (2015) indicates that the impact of formative assessment arises from the strength of the feedback provided to students about their learning and to teachers about their teaching. According to Shute (2008, p. 154), formative feedback is information transmitted to students that allows or encourages them to organize their thoughts or behaviors in order to improve their learning.

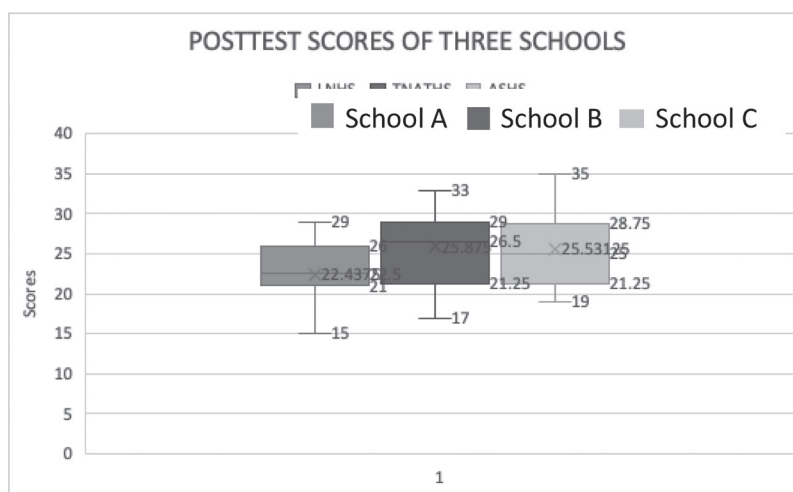


Figure 6. Comparison of the Posttest Scores of Three Schools

The data presented on the charts supported the findings of Black and William (1998) that formative assessment raises the standard of achievement, help students in self - assessment and helps low achievers and learners with learning disabilities to believe that they can still improve through feedback. Mathematics instruction and assessment can provide opportunities for students to make deeper connection, perform worthwhile tasks and apply math in their daily lives.

Per school performance of the students was used to analyze the data. The paired samples t-test was utilized in examining the data between the two schools which also determines the academic achievement of Grade 11 students. A level of significance of 0.05 determined the critical values.

The t – test of the posttest scores between School A and School B shows that the computed value of 3.410 is greater than the critical value of 1.697 when the posttest scores of School A and School B are compared implying that there is a significant difference in the students' post test score between these schools.

Table 1 t – test of Posttest Scores of SCHOOL A and SCHOOL B			
	t - computed	t - tabular	Decision
School A – School B	3.410	1.697	<i>Reject Ho</i>
Significant at $\alpha = 0.05$			

Table 2 shows the computed value of 2.800 which is greater than the critical value of 1.697 implying that differences in the posttest scores of the students between these schools are significant.

Table 2 t – test of Posttest Scores of SCHOOL A and SCHOOL C			
	t - computed	t - tabular	Decision
School A – School C	2.800	1.697	<i>Reject Ho</i>
Significant at $\alpha = 0.05$			

Table 3 reflects the computed value of 0.334 which is lower than the critical value of 1.697 at 5% significant level which shows that there is no significant difference among the posttest scores of the students in these schools.

Table 3 t – test of Posttest Scores of SCHOOL B and SCHOOL C			
	t - computed	t - tabular	Decision
School B – School C	0.334	1.697	<i>Fail to Reject Ho</i>
Significant at $\alpha = 0.05$			

The result showed that the achievement of students in mathematics significantly improve after formative assessment was given to them. However, the low scores obtained by the students both in the pretest and posttest also provides information that they still obtained low performance as reflected in the box plots and the table above.

One defining factor on this low achievement of students can be gleaned from a very difficult assessment tool. Chappius and Chappius (2007) supports this claim and stressed that the range of assessments in class as a way to guide instruction and to authentically determine students' mastery offers many advantages far beyond higher test scores. *Some teachers use assessment as a punishment for misbehaving students which cause loss of validity and reliability of assessment leading to a very difficult test items that tortures the students especially those who belong to a lower and average level learner.*

With this notion in mind, assessment tool was revised deleting items with very high difficulty index shown in the box plots below. *This action will definitely retain the consistency and validity of the results regardless of the level of understanding of the learners.*

The academic achievements of the students where formative assessment practices were applied were found to be significantly higher than those where no formative assessment practices were applied.

Figure 7 summarizes the comparison of the posttest scores of the three schools after deleting ten items with very high difficulty index.

As seen in the figure, School C registered the highest posttest score while School A was the lowest. However, School B and School A showed second quartile score that is greater than the median as compared to School C.

This result was supported by the study conducted by Tekin (2010) which found that formative assessment practices in mathematics class significantly increased student's attitudes towards mathematics. According to Irons (2008), formative assessment improved students' attitudes toward learning because it focused primarily on helping students understand their learning levels.

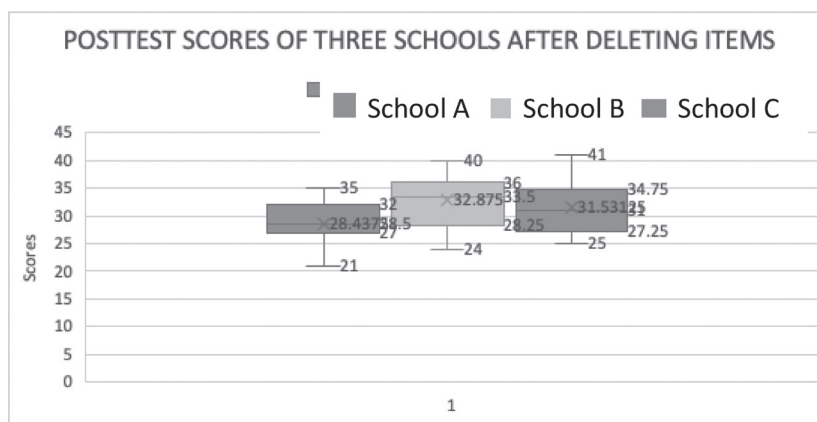


Figure 7: Comparison of the Posttest Scores of Three Schools After Deleting Items 2, 3, 5, 19, 22, 23, 26, 41, 47, and 48.

Table 4 presents the t – test of the posttest scores between School A and School B after deleting ten items with very high difficulty showing that the computed value of 2.402 which is greater than the critical value of 1.697 implied that there is a significant difference in the posttest scores of the students between these schools.

Table 4	t – test of Posttest Scores of SCHOOL A and SCHOOL B After Deleting Items 2, 3, 5, 19, 22, 23, 26, 41, 47, and 48		
	t - computed	t - tabular	Decision
School A – School B	2.402	1.697	<i>Reject Ho</i>
Significant at $\alpha = 0.05$			

The t – test of the posttest scores between School A and School C after deleting ten items with very high difficulty index revealed a computed value of 2.800 that is greater than the critical value of 1.697 which inferred that the differences in the posttest scores of the students between these schools are significant.

Table 5	t – test of Posttest Scores of SCHOOL A and SCHOOL C After Deleting Items 2, 3, 5, 19, 22, 23, 26, 41, 47, and 48		
	t - computed	t - tabular	Decision
School A – School C	2.800	1.697	<i>Reject Ho</i>
Significant at $\alpha = 0.05$			

The computed value of 1.305 is lower than the critical value of 1.697 at 5% significant level showed that there is no significant difference among the posttest scores of the students in these schools.

Table 6	t – test of Posttest Scores of SCHOOL B and SCHOOL C After Deleting Items 2, 3, 5, 19, 22, 23, 26, 41, 47, and 48		
	t - computed	t - tabular	Decision
School B – School C	1.305	1.697	<i>Fail to Reject Ho</i>
Significant at $\alpha = 0.05$			

Guide questions as interview guide was also used to further gather data on the beliefs of teachers and students about assessments and their purposes.

Teachers' Beliefs about Classroom Assessment

Teachers' responses on the interview guide revealed seven beliefs concerning classroom assessment listed as follows:

1. Assessments which take place informally in the class are the best ways of assessing students' performance. Unplanned assessment clearly determines the readiness of the students to learn.
2. Informal assessments are a waste of teaching time. It is an additional job especially informal assessment has to be recorded and graded.
3. Assessment is a joint venture between teachers and parents. Parents should also participate in knowing how their children performs in school.

4. Assessment encourages students to look critically on their own classroom performances. Teachers believe that positive feedbacks should always be given to the students to motivate to learn.
5. Assessments in the form of direct observation reduces students' academic achievements. Some teachers might focus on observing how a student performs rather than doing authentic assessments to determine the academic achievement of the students.
6. Assessment pressurizes teachers to complete their syllabi or lesson plans.
7. Assessments, in the form of formal tests, makes a negligible contribution to student learning.

Student's beliefs about assessment

Students' responses on the guide questions showed that they are strongly influenced by the form of assessment they expect.

The strategic approach to learning was also found to be sensitive to the assessment procedures used and/or expected. This is because of the belief of the students that teachers have the final say on such indicators of academic success such as student grades, hence, it seems to be reasonable that students seek information and form opinions about 'what the teacher wants'.

Within the context of assessment, students' responses revealed four student-centered factors occurring as follows:

- (a) Students' valued self-management and, generally examinations were seen as less supportive of its development. Deadlines were not seen in themselves as helpful.
- (b) Assessment, seen by the students as a powerful motivator, was regarded as a major vehicle for learning.
- (c) In order to help them learn, students wanted to know what was expected of them and a clear assessment criteria.
- (d) Students closely linked the provision of feedback with support.

Students often reacted very negatively when they discussed what they regarded as 'normal' or traditional assessment. When students considered new forms of assessment, their views of the educational worth of assessment changed. *Students usually considered a form of assessment to be new when it is not usually or commonly used in the teaching and learning set up. Hence, when a new form of assessment was introduced, they usually feel negatively about it.*

Many students believed that traditional assessment tasks are arbitrary and irrelevant. Traditional assessment is believed to be inappropriate as a measure, because it appeared, simply to measure your memory, or in case of essay- writing tasks, to measure your ability to marshal lists of facts and details.

Alternative assessment was believed to be fairer because it appeared to measure qualities, skills and competences which would be valuable in contexts other than the immediate context of assessment.

The issue of fairness, from the student perspective, is also a fundamental aspect of assessment which is often overlooked or oversimplified by the teacher. To students, the concept of fairness frequently embraces more than simply the possibility of cheating

Students expressed the view that traditional assessment is an inaccurate measure of learning. When discussing alternative assessment, many students believed that success more fairly depended on consistent application and hard work.

Alternative assessment was fair because it was perceived as rewarding to those who consistently make the effort to learn rather than those who rely on cramming or a last-minute effort.

It can be concluded that students' beliefs of poor learning, lack of control, arbitrary and irrelevant tasks in relation to traditional assessment contrasted sharply with their belief of high-quality learning, active student participation, feedback opportunities and meaningful tasks in relation to alternative assessment.

Implications

The frequency scores of the Grade 11 students improved after the interventions were given by the teachers. This served as a proof of the significance of providing assessments in classroom instructions.

Furthermore, the result of the study confirmed the need to really implement the policy guidelines on classroom assessment for the K - 12 Basic Education Program stipulated in Dep - Ed order No. 8, series of 2015.

Recommendations

Based on the findings and conclusion of the study, the following are recommended:

1. Teachers should give students' opportunities to show what they know through varied and frequent assessments.
2. Teachers are encouraged to attend seminars and trainings on teaching strategies and interventions to improve their teaching methods.
3. Teachers should provide focused and targeted feedback to their students. The feedback should highlight gaps in understanding and specifically to inform students on how they can improve their learning rather than listing where they get wrong.
4. Teachers should provide corrective activities and achievement activities as appropriate

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Innovative School Experiments

Reviewer's Comments/Suggestions and Author's Actions

Comments/Suggestions	Action Taken
Page 5- Figure 5- The colour for school C should match.	Complied
Page 5- Figure 5- The colour for school C should match.	Complied
The scores of second quartile scores in the figures and the median should also be mentioned in the text to make the statistical information clearer.	This is a very good suggestion which the author failed to see. However, those findings have been already complied (<i>those which are written in italics – pages 5, 7, 8</i>).
APA format should be followed.	Complied
Please refer the statement on page8 which says- <i>One defining factor on this low achievement of students can be gleaned from a very difficult assessment tool. Chappius and Chappius (2007) supports this claim and stressed that the range of assessments in class as a way to guide instruction and to authentically determine students' mastery offers many advantages far beyond higher test scores.</i> The author then deletes test items of very high difficulty index based on this assertion. However, the above statement (in italics) needs to be drafted in such a way that the resulting action taken by the researcher must evolve from it.	Complied (<i>those which are written in italics – pages 10 – 11</i>).
The pretest and the post-test items should of the same difficulty level. But the researcher seems to have made modifications in the post test paper only. Needs explanation for this.	This is again a very good comment from the reviewer. But the author would like to point out that pre – test and post – test is of the same difficulty level. However, in support to the claim of the study <i>by Chappius and Chappius (2007)</i> , the revision of the test was done and another set of tests was given to the respondents. For those which are not complied, the author will be looking to incorporate all these great suggestions/comments in the future paper.
The 'new forms of assessment, or 'alternate assessments' perceived by the students (page 8) should be elaborated.	Complied (<i>page 13 – Italicized</i>)
Language editing is needed at some places. For example, <i>provides information that they still obtained low performance</i> (page 6).	This is another great observation. The author and the language editor might have failed to see this. Hence, occurrence of similar lapses will be prioritized by the author in the next paper to be submitted for publication.

Students' Perception about Collaboration, Social Interaction, and Flexibility in Flipped Learning: a Study

Ilfa Zaidi, Mirza Shahzan Asagar and Harjeet Kaur Bhatia

Abstract

Flipped learning is a new way of learning that encourages students to participate actively in their own learning process. It facilitates a flexible learning environment, collaboration and social interaction through hands-on activities, group projects, and online platforms. Hence, some of the advantages of flipped learning are attracting researchers to conduct more studies on flipped learning in different contexts. Therefore, this study attempted to see how flipped learning affects senior secondary school students. The study was conducted on a sample of 60 senior secondary school students from two private schools in Delhi selected on a convenience basis. The questionnaire was administered to elicit responses from the students. Findings revealed that students' responses were positive that flipped learning provided them opportunities of collaboration, social interaction, and flexibility in their learning style. This indicates that students were happier with their learning in a flipped environment.

Key Words: Flipped Learning, Social Interaction, Learning environment, Active Learning, Collaboration, Flexibility

Introduction

Flipped learning has gained significant attention in educational research and practice as an innovative approach that emphasizes the active participation of students in their own learning process. It addresses the changing demands of our education system. Aljaraideh (2019) stated that flipped learning is the learning in which a teacher gives students fundamental knowledge before class, allowing teachers and students to focus more on higher-order thinking skills. Seery (2015) identified flipped learning as a constructivist approach which encourages active learning, structured activities, and student engagement through various in-class work management and bridging activities. The key element of flipped learning is to provide flexibility regarding time, space, and individualized learning experiences. Students have the freedom to learn the material at their own pace in preferred learning environment (Nouri, 2016). It also improves students' understanding and responsibility as students take responsibility for their learning when they are at home (Aidoo et al., 2022). Zainuddin and Halili (2016) also mentioned that flipped learning allows students to read learning materials according to their flexible time and pace. As a result, students will spend less time on listening to extensive lectures and more time solving issues individually or collaboratively with peers. It gives personalized

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learning experiences and accommodates diverse learning styles and preferences (Sohrabi & Iraj, 2016). Furthermore, Koehler et al. (2013) mentioned that for the success of flipped learning there should be a balance between three key areas in the classroom, i.e., content delivery, pedagogical understanding, and technological integration.

According to Hwang et al. (2022), flipped learning has many benefits for students, including improving their motivation, critical thinking skills, and self-efficacy. It also encourages peer interactions, problem-solving, and collaboration among students (Ramirez & Salas, 2021), while enhancing their knowledge and skills (Karabulut-Ilgu et al., 2018). Flipped learning has been shown in several studies to increase student interactions and engagement, with participants reporting improved interactions with instructors and classmates (Chen et al., 2014; Hung, 2015). This leads to more opportunities for collaboration, classroom discussions, and problem-solving (Love et al., 2014; McLaughlin et al., 2013). Furthermore, flipped learning allows for structured independent learning, with teachers able to provide feedback and assistance through innovative resources and learning management systems, while also implementing collaborative problem-solving activities and group discussions in face-to-face lessons (Or et al., 2022). Students may be taken to the middle level of Bloom's Taxonomy from lower level. Instead of helping them at only lower levels, i.e., knowledge and comprehension, these levels may be catered to by pre-class activities. Now teachers may help them to be at application and analysis level by taking up these activities in the class and be with them to support them when they need scaffolding. The planning of pre-class and in-class activities may help students to reach higher levels of Bloom's Taxonomy and thereby engage in meaningful discussions that can develop critical thinking skills in students.

Hence, Flipped learning provides a dynamic and interactive learning environment where the teacher gives the learning material to the learners before entering the school so that they can read the material at their convenience and discuss it later in the classroom. This study is conducted to see the perception of students regarding collaboration, social interaction, and content flexibility in flipped learning which can help inform future teaching practices.

Context of the Study

This research was carried out on two Private Schools of Delhi because flipped learning approach has been practised in these schools. The Senior secondary students were the primary focus of this study, i.e., students who are studying in grade 11th and 12th.

Need for the Study

The increasing development of digital technologies and their application in education facilitates new learning ecologies that offer students new web-based learning opportunities and resources. This rapid spread of interactive technologies has facilitated the adoption of innovative approaches in higher education that help to promote collaborative learning, exploration, and research in online networked learning environments (Campillo-Ferrer & Miralles-Martínez, 2021). The Horizon Report focuses on exploring and reporting emerging technology in education, the flipped classroom has been highlighted as an emerging technology for higher education which is very important to use at college level (Johnson et al., 2013).

India's National Education Policy (2020) emphasises the need to focus on experiential and immersive learning, which is exactly what flipped learning aims to achieve. It allows them to progress through their studies at their own pace and accumulate credits in the Academic bank of credits towards their degrees and ensures that every student has equal access to education, regardless of their background or circumstances. The flexibility required in this kind of context, may be enhanced by use of flipped learning. The goal of NEP is to provide students with a more well-rounded and effective educational experience which involves innovative use of technology including flipped learning (NEP 2020: The Journey so Far - Times of India, 2022).

Some research studies have shown positive effects of the flipped classroom model in teaching and learning activities. For example, Davies et al. (2013) compared the traditional, simulation-based, and flipped classrooms in a college-level introductory spreadsheet course. It required students to read and comprehend the learning during pre-class activities, such as watching a video or studying lecture notes beforehand. As a result, it decreases the learning burden of students in schools. Nouri (2016) found that flipped learning promotes student engagement that results in active learning in higher education. McLaughlin et al. (2013) mentioned that students can enrich the dialogue with their friends both inside and outside the class because the activity of teaching-learning in a flipped classroom is not just limited to behind the classroom wall which may result in giving students flexibility and more opportunities for collaboration, while also ensuring that they are active and interacting.

It increases motivation and creates more supported learning processes due to teacher and peer scaffolding in and out of class. Campillo-Ferrer and Miralles-Martínez (2021) found that students have a strong inclination towards flipped learning because of flexibility, easy access to online academic resources, and interactive learning environment. Murray et al. (2015) stated that flipped learning allows students to watch the video at a time that suits their schedule and learning needs. Furthermore, Seery (2015) stated that flipped learning facilitates an active learning environment where students can build new ideas. Aidoo et al. (2022) indicated in his study that students like the convenience and accessibility of the video lectures outside standard learning hours in school.

However, some studies have criticized flipped classrooms as being ineffective as they rely much on students' attitudes towards video lectures (Kettle, 2013), lack of out of class support (Bhagat et al., 2016), low self-regulatory abilities, inability to ask questions during out of class learning and an increased amount of learning tasks (Wang, 2016). Agung and Surtikanti (2020) highlighted some technology-based problems when they found that most students surveyed were not enthusiastic about online learning mainly due to lack of access to the internet and other technological resources, which may be revealing the problem of the digital divide.

The educational institutions have adopted flipped learning in recent years, and it is worthwhile to examine how the users have perceived such a change (Or et al., 2022). The studies reviewed indicated that though research on student perception of the flipped classroom approach had been conducted at higher education level, there are limited studies on perception and the nature of student experiences related to the flipped classroom approach at senior secondary level. This research gap can be filled by exploring how senior secondary students perceive flipped learning.

Objective of the Study

1. To study the students' perceptions about Flipped learning in terms of:

- a. Collaboration during in-class activities
- b. Social interaction
- c. Flexibility in content/instructional material

Research Methodology

Sample

This research employed a convenience sampling technique to select sixty senior secondary students from two private schools in Delhi because flipped learning was being practiced in these schools.

Questionnaire

Researchers developed a questionnaire by adapting items from studies Bhagat et al. (2016), Karabulut-Ilgu et al. (2018). The permission from these authors was also sought to use the items in their study for the present study. Apart from this, studies done by Aidoo et al. (2022), Ramirez and Salas (2021), So and Brush (2008) were also consulted by the researchers for developing the questionnaire. The questionnaire consisted of two parts.

Part I: aimed to assess students' perceptions about flipped learning. It comprised seventeen items based on a 5-point Likert scale from "strongly agree" to "strongly disagree". Specifically, there were six questions related to collaboration, four questions were about social interaction, and seven questions were about flexibility in terms of time management, material availability, and the learning environment.

Part II: This part had two open-ended questions about students' perception about flipped learning.

Analysis and interpretation of data

Data was collected via Google Form. Then, it was analysed by calculating percentage, mean and standard deviation with the help of SPSS software. Whereas open-ended questions were analysed through coding. Analysed data was presented in tables and graphs. Lower and upper limit of the 5-point Likert-type scale was also calculated by the researchers to equal the range of the cells (Shah et al., 2022).

Table 1 Scoring range of the Likert scale of the survey.		
SCALE	Lower Limit	Upper Limit
Strongly Disagree	1	1.80
Disagree	1.81	2.60
Neutral	2.61	3.40
Agree	3.41	4.20
Strongly agree	4.21	5.00

Findings and Discussion

The findings of the study are presented here:

Objective 1.a. To study the students' perceptions about flipped learning in terms of collaboration during in-class activities.

Focus of this dimension was to examine the collaboration while participating in in-class activities in a flipped learning environment.

Table 2 Students' responses regarding collaboration during in-class activities in flipped learning.							
Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
	(In Percentage)						
Flipped learning enhances communication with my classmates.	36.7	53.3	10	0	0	4.27	0.63
Flipped learning helps me feeling like I belong to a learning community.	36.7	40	20	1.7	1.7	4.08	0.89
Flipped learning helps me participate actively in group discussions with peers.	41.7	40	16.7	1.7	0	4.22	0.78
Flipped learning helps me develop new skills and knowledge from peers.	40	38.3	18.3	3.3	0	4.15	0.84
Flipped learning allows me to learn and understand the perspective of my classmates from diverse backgrounds, which helps me understand how something can be viewed differently.	46.7	38.3	13.3	0	1.7	4.28	0.83
Flipped learning helps me in developing problem-solving skills through peer collaboration.	33.3	40	25	1.7	0	4.05	0.81
Overall						4.18	0.8

From the data presented in Table 2, the statement “*Flipped learning allows me to learn and understand the perspective of my classmates from diverse backgrounds*” (Mean=4.28; SD=0.83) shows the highest mean and “*flipped learning enhances communication with my classmates*” (Mean=4.27; SD=0.63) shows the second-highest mean. This mean value indicates that students strongly agreed, and the standard deviation indicates that their responses were more homogeneous on these statements. This finding is consistent with the study by Sohrabi and Iraj (2016) which suggests that flipped learning provides opportunities for promote understanding and appreciation of diverse perspectives among students. This method also fosters a collaborative learning environment by encouraging learning experiences for different student subgroups.

However, the statement “*Flipped learning helps me in developing problem-solving skills through peer collaboration*” (Mean=4.05; SD=0.81) shows the lowest mean and standard deviation indicates that students’ responses were quite homogeneous on this statement. Moreover, the statement “*Flipped Learning helps me feel like I belong to a learning community*” (Mean=4.08; SD=0.89) shows the second lowest mean. It means students found agreed with this statement but the standard deviation suggests that their responses were heterogeneous as compared to the other statements of this dimension. Teachers could consider providing multiple avenues for problem-solving to accommodate individual learning preferences, such as offering written or visual explanations in addition to video lectures. These results are consistent with previous studies by Karabulut-Ilgu et al. (2018); Ramirez and Salas (2021) in which it is pointed out that flipped learning engages the learners in collaborative work and fosters their development through active participation.

The overall mean value of this dimension (mean=4.18; SD=0.8) indicates that the respondents agreed that flipped learning enhances their collaboration during in-class activities. Aidoo et al. (2022); Campillo-Ferrer & Miralles-Martínez (2021); Love et al. (2014) have found that flipped learning has positive impacts on students’ learning, critical thinking, and provides opportunities to collaborate with each other in education.

Objective 1.b. To study the students’ perceptions about flipped learning in terms of social interaction.

The aim of this dimension was to see the perceptions of senior secondary students about social interaction in a flipped environment.

Table 3 Students’ responses regarding social interaction in Flipped Learning.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
Items	(In percentage)						
Flipped learning allows me to spend more time interacting with my classmates.	31.7	43.3	16.7	5	3.3	3.95	1
Flipped learning allows me to spend more time interacting with my teachers.	30	33.3	31.7	5	0	3.88	0.9
Flipped learning allows me to interact with classmates in and outside of class through online platforms.	35	38.3	20	6.7	0	4.02	0.91
Flipped learning allows me to interact with teachers in and outside of class through online platforms like discussion boards.	26.7	40	25	0	8.3	3.77	1.11
Overall						3.9	0.98

Data presented in Table 3 indicates that the statement “*Flipped learning allows me to interact with classmates in and outside of class through online platforms*” (Mean=4.02; SD=0.91) has the highest mean. Moreover, the statement “*Flipped learning allows me to spend more time interacting with my classmates*” (Mean=3.95; SD=1.0) shows the second highest mean. Mean of these statements denoted that the students agreed on them. However, standard deviation indicates less homogeneity in the respondents’ views. Findings are in line with the study of McLaughlin et al. (2014) in which it is mentioned that flipped learning promotes interaction and builds confidence in students by engaging them in group activities and discussion during class time.

On the other hand, the statement “*Flipped learning allows me to interact with teachers in and outside of class through online platforms like discussion boards*” (Mean=3.77; SD=1.11) has the lowest mean value in this dimension. It shows students agreed with this, and the standard deviation indicates that the participants’ responses were more heterogeneous. To address this, the teacher should provide more guidance on how to effectively use these online tools and offer more feedback and support to students who are struggling to engage with which would help the students feel more connected and engaged with their coursework, both inside and outside of class. These findings are consistent with the studies of Hwang et al. (2022); Sohrabi and Iraj (2016); and Zainuddin and Halili (2016), in which it was asserted that teachers allocate additional time to students for learning that impacts their academic achievement level positively.

Table 4 Students’ responses regarding flexibility in content/instructional material in Flipped Learning							
Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
	(In Percentage)						
Flipped learning provides adequate material beforehand	15	41.7	31.7	6.7	5	3.55	1
Flipped learning helps me know what to read before class and how much.	23.3	36.7	31.7	3.3	5	3.7	1.03
Flipped learning facilitates more time to study.	26.7	33.3	28.3	5	6.7	3.68	1.13
Flipped learning facilitates me to view online content (ppts, videos, etc.) as often as I need.	20	46.7	28.3	5	0	3.82	0.81
Flipped learning allows me to learn as per my convenience outside the class.	21.7	33.3	36.7	5	3.3	3.65	0.99
Flipped learning helps me to stay motivated and engaged in the course when in and outside of the classroom.	25	40	31.7	3.3	0	3.87	0.83
Flipped learning allows me to manage my time effectively when at home.	18.3	40	31.7	5	5	3.62	1.01
Overall						3.7	0.98

From the data presented in Table 4, the statement, “*Flipped learning helps me to stay motivated and engaged in the course when in and outside of the classroom*” (Mean=3.87; SD=0.82) shows the highest mean followed by the statement “*Flipped learning facilitates me to view online content as often as I need*” (mean=3.82; SD=0.81). This mean value indicates that students agreed, and the standard deviation indicates that their responses were more homogeneous on these statements. Additionally, the statement “*Flipped learning helps me know what to read before class and how much*” (mean=3.70; SD=1.03) mean shows that students agreed with these statements. The computed standard deviation of the item indicates more heterogeneity in the responses provided by the students. Magaña et al. (2022), Lo and Hew (2017) also affirmed that the utilisation of pre-class materials in conjunction with the pedagogical approach of flipped learning could foster a learning environment that is student-centred and promote self-directed learning.

The overall mean value of this dimension (mean=3.90; SD=0.98) indicates that the students agreed that flipped learning enhances social interaction in the class.

Objective 1.c. To study the students' perceptions about flipped learning in terms of flexibility in content/instructional material.

The purpose of this dimension was to see the perception of students about flexibility in the content/material provided to them by the teacher in flipped learning.

Moreover, the statement "*flipped learning provides sufficient pre-course material*" (Mean=3.55; SD=1.00) shows the lowest mean followed by the statement "*Flipped learning enables effective time management while at home*" (Mean=3.62; SD=1.01). So, this mean value denotes that students agreed on these statements, but the standard deviation implies that participants' responses were more heterogeneous on these statements. In order to maximise student achievement, teachers must assign reasonable amounts of pre-class work and offer extra assistance to those who may find it challenging. Additionally, encouraging open communication and discussion among students can boost student motivation and engagement.

The overall mean value of this dimension (mean=3.7; SD=0.98) indicates that the respondents agreed with the concept that flipped learning provides flexibility in content/instructional material. However, among all three dimensions (collaboration, social interaction, and flexibility in content), overall mean was highest for collaboration, i.e., 4.18 and least for flexibility, in content i.e., 3.70. Hence, emphasis should be given on flexibility in content/instructional material for making flipped learning more effective.

Findings of open-ended questions

Two open-ended questions were also asked by the students. The first question was about how flipped learning has changed their learning and comprehension of the subject matter.

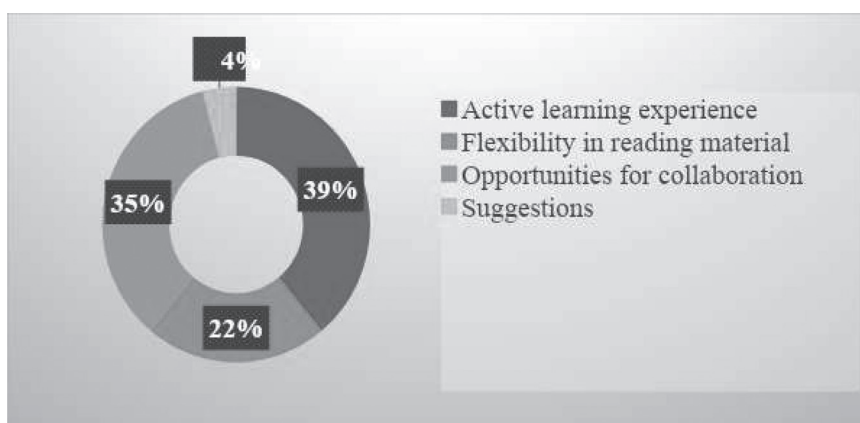


Figure 1 Responses of participants about the impact of flipped learning on their learning process and comprehension of the subject matter.

Figure 1 shows that a significant proportion of participants (39%) stated that active learning helps them to learn and build understanding about the subject. As one respondent stated, "*I feel confident when I put views in class.*" Another participant documented, "*Better discussions related to the topic enhance the understanding of the topic, and different opinions expand the viewpoint.*" Moreover, 22% of participants mentioned that

due to flexibility in reading material it is easy to learn. As one respondent reported, *"I clear my doubts that I read at home"* and another student stated, *"Easy access to quick notes."* However, 35 % students mentioned flipped learning provide the opportunities for collaboration. A responded stated that *"I enjoy participating in class activities in which we learn many things through group collaboration."* While 4% respondents suggested ways to improve flipped learning. Like one student wrote, *"Give enough study material to study."*

Second open-ended question was about how they handle pre-class work and how it helps them preparing for class discussions and activities.

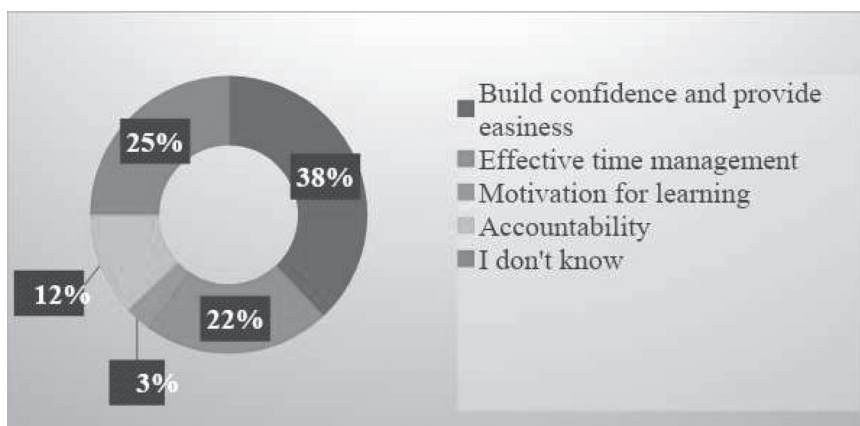


Figure 2 Responses of students about how they handle pre-class work and how it helps them preparing for class discussions

Figure 2 showed that 38% of respondents answered that flipped learning build confidence in them and provide easiness in the knowledge through pre-class material. One respondent reported, *"I felt comfortable and confident because I know already what teacher will teach me in the class."* Additionally, 22% of the participants indicated that engaging in pre-class work resulted in advantages such as *"effective time management and active involvement in class discussions"*. A small proportion of participants, i.e., 2.5% reported that pre-class material motivated them for learning. However, 25% respondents provided a response by stating, *"I do not know"* or *"not know."* Furthermore, 12 % participants indicated that engaging in pre-class work has made them accountable because of remote and self-paced learning. One student reported that *"As much as it makes me accountable and independent by learning and gathering pre-class knowledge through self-study."*

Conclusion

In short, this study found that flipped learning approach affects the learning and engagement of senior secondary school students positively. It fosters interpersonal communication in students and enables them to collaborate during face-to-face sessions by providing educational materials before entering the classroom. In addition, the research revealed that respondents found flipped learning favourably, mentioning its potential to increase interaction with teachers and peers and to provide a flexible learning environment. The students perceived flipped learning helped them the most in the collaboration, followed by social interaction and then flexibility. There needs to be sensitization of teachers towards the perspective of the students so that the teachers may further strengthen flipped learning for collaboration and provide more opportunities to

the students for social interaction and flexibility, as in the contemporary context these dimensions assume great significance. This research also suggested that it is prudent to take feedback from students so that effectiveness of flipped learning can be improved.

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Students' Reactions to Teacher's Written Feedback in the ELT Classroom

Ailyn C. Caballero

Abstract

The need for supporting student writing has received much attention in writing research. One specific type of support is feedback. Feedback is a word that needs thorough definition for it represents a useful contribution to learning. Teacher gives feedback on students' written output to hone their writing skills and build their confidence. As such, teachers' feedback plays a vital role in producing self-regulated writers. However, it is not easy for learners to process feedback in order to improve their writing skills if it is delivered in a random manner and without clear relation to the teaching input. This study investigates the students' reactions to their teacher's written feedback in their Field Study 3 manuals. Thirty college students from Pamantasan ng Lungsod ng Muntinlupa were selected in the study. As a qualitative research, document analysis and interviews are used. The study has shown that feedback improved students' writing. The findings in this study provide teachers with some insights into effective ways of assisting students in learning to analyze their weaknesses and in developing their writing skills.

Key Words: Feedback, Practices, Students' Reactions, Student Writing, Teacher's Feedback, Written Corrective Feedback

Introduction

Background

Writing is one of the macro skills that is normally referred to English language. It is the symbol of language by means of text form. Writing is needed for transferring, recording and relating information effectively from user to user (Merriam Dictionary, 2010). It is a central expertise that comprises a whole live skill, ingenious development in discovery, subsequent and determining scheme, analysis system, feedback, and modification (Lainuddin, n.d).

One of the things that teachers can do to assess their students' writing skill is through feedback. Feedback is a word that needs thorough definition for it represents a useful contribution to learning.

In writing area, corrective feedback *on form* is concerned with any incorrect grammatical or lexical use of the target language. It is noted from *feedback on content*, which denotes to any remark, proposition, query, or request for elucidation, amplification and data given by the teacher that concerns to the ideas, organization, style, and rhetorical construction of the text (Hyland & Hyland, 2006 as cited in Guenette & Lyster, 2013).

As contend by Hattie and Timperley (2007), the main function why there is feedback is to lessen the gap between understanding and performance. Where am I going? How am I going? Where to next? These are the

three major questions to be answered to have effective feedback (Hattie & Timperley, 2007 as cited in Bergh, Ros & Beijgaard, 2013). They also added that in order to develop students' learning and teacher's feedback, it is of primary significance that teacher must establish definite learning objectives. Likewise, these learning goals must be communicated to the students for better understanding.

On the other hand, Lee (2008) argued that students' perceptions on teachers' feedback and the teachers' practices are intertwined with each when it comes to feedback. Giving feedback to students' writing is sometimes not well understood by the students because it is not clear to them even though feedback is known as one of the ways for the assessment in connection with the different facets of learning. Students do not know how to understand their teachers when it comes to the comments being seen in their work. It is not easy to apprehend what the teachers are trying to point out. It often receives negative views on both sides.

However, there has been little attention given to the reactions of the students in their received comments coming from their teachers. Current study on students' views of teacher feedback is inadequate by the weak link between students' reactions and teacher feedback.

This study contributes to existing feedback research by relating students' reactions to actual teacher feedback in classroom setting, focusing mainly on how the relative issues might have influenced students' responses to teacher feedback and how teacher make corrective feedback. Being aware of students' reactions can help teachers adjust the way they give feedback, produce positive students' responses, respond to the needs of the students, and to bring life-long positive effects on student writing.

Theoretical Support

This study is anchored in two theories namely Interactional Feedback by Long and Input Hypothesis by Krashen in giving feedback.

Needless to say, interactional feedback is viewed by many researchers as the center of the second language learning. The latent benefits of interactional feedback can be seen in several theories in Second Language Acquisition such as the Interaction Hypothesis by Long (1996) and Input Hypothesis by Krashen (1985). Both input and interaction are essential in the teaching-learning process. Likewise, they are both necessary components in the learning process because they alert, assist and encourage learners to be better learners, thinkers, speakers and journalists.

Input Hypothesis is important in this study because teachers will become aware of how they provide feedback to students' writing. Teachers will become mindful if the feedback they are providing is comprehensible or not. In addition, the effectiveness of input is amplified when students have to negotiate the meaning. Thus, Interaction Feedback is needed in this process. Face-to-face interaction is important to clarify things with regard to students' writing. Interaction facilitates acquirement because of the conversational modifications that provide learners with the input they need. They now have more time to process the input they receive coming from the teachers. This can lead to better understanding to students and teachers.

Statement of the Problem

The role of any type of feedback has been a critical area of second language acquisition research for the past decades. Many factors must be given considerations regarding feedback. The classroom context can have

a direct impact on how students perceive the teachers' feedback. How students respond to feedback may be influenced by the teacher who delivers the feedback, who the teacher is and how he or she interacts with students during the feedback process. Thus, it is necessary to go beyond the act of feedback to examine the factors that influence students' reactions regarding feedback.

With this purpose in mind, the present study specifically sought to answer the following research questions:

1. Do students learn from teacher's written feedback?
2. How do students react to the feedback provided by their teachers?

Method

Research Design

Teachers give feedback to student writing to ensure the maximum development of one's totality as regard to writing.

A qualitative design specifically the Basic Qualitative Research, naturalistic inquiry strategy of approaching a setting without preexisting assumptions, is deemed appropriate for the study that seeks to explore how students react to the feedback provided by their teacher. "How people interpret things and experiences" is one of the interests of Basic Qualitative Research.

Participants

Thirty-six college students participated in the present study. Of all the participants, ten (10) male students and twenty-six (26) female students came from Pamantasan ng Lungsod ng Muntinlupa. The university is a public school located in NBP Reservation Katarungan I, Poblacion Muntinlupa City. The researcher chose the Field Study 3 subject as the source of the data because the students are required to answer their manuals. For them to qualify to be participants in this study, they should **a)** be bonafide and regular Second Year students, **b)** have studied in Pamantasan ng Lungsod ng Muntinlupa (PLMun) from first year (first and second semester) up to now, and **c)** taking English as their specialization.

The students came from various social classes where they are placed together aiming to excel in their academic life. Majority of the students speak English in the class because of the rule "English Policy" in their field of specialization.

Data Collection Technique and Procedure

The researcher collected the qualitative data purely via document analysis of Field Study 3 (Technology in the Learning Environment) manuals of the students. Anchored on the National Competency-Based Teacher Standards and the Competency Standards of CMO 30, s. 2004, the Field Study courses are practical learning experiences which are aligned to the professional education courses. Additionally, the researcher got the qualitative data through individual qualitative interview with thirty students.

Data Analysis

The researcher did the analysis of data by distinguishing the themes that resulted in the gathered data. For themes to really surface, the researcher meticulously compared and contrasted each of the students' reactions

about their teacher's written feedback. Due to this painstaking process, the researcher was able to know if the feedback is either equal in form or in meaning.

The results of the initial analysis, in the form of coding were tabulated using Microsoft Excel. The coded responses were considered under two types, positive or negative. Specifically, the researcher followed the successive steps in doing the qualitative data analysis of students' reactions about their teacher's written feedback.

Step-by-Step Process of Analysis to the Construction of the Themes

- a. Researcher transcribed all the recorded conversation.
- b. Researcher read the transcribed conversations of students' reactions about their teacher's written feedback on their output.
- c. Researcher put some symbols such as cross, check, star or even shapes. These symbols helped the researcher distinguish which of the conversations mean the same thing.
- d. Researcher coded all the marked data.
- e. Researcher e-read initial codes to check on the exactitude of details under the initial codes.
- f. Researcher made an initial classification of codes into themes.
- g. Researcher merged all the lists. They were done manually and tabulated on Microsoft Excel into one master list of major themes from all the data.
- h. Researcher identified the cyclical patterns reflected in the master list.

Steps a-h were done manually.

Results and Discussion

Question # 1: Do students learn from teacher's written feedback?

In order to find out whether the students learn from teacher's written feedback, the data I got from the interview were analyzed by means of looking at the recurring themes in the corpora.

Student-participants of the study consistently recognized the value and the use of feedback in understanding teacher's written feedback. Though majority of the participants clearly articulated the minute attention that they give to the comments coming from their teacher all throughout the semester, they all acknowledged that feedback of the teacher has instructional value and can be considered as an effective tool in evaluating learning. Improvements on how the teacher should write the feedback and how she utilized in class were proffered for an optimal use in instruction.

Question # 2: How do students react to the feedback provided by the teachers?

Making a student understand the comments of the teacher is one of the most widely recognized uses of feedback. The standards in feedback clarify to the students the targets that are to be achieved during the

assessment. This use of feedback was expressed when students were asked about their initial reaction to the comments coming from their teacher. The students distinctly expressed:

Teacher's feedback serves as a guide for me to improve something regarding my output. (Student # 5)

Students # 1, 3, 4, 5, 6, 8, 11, 12, 14, 15, 20, 23, 27, 32, 33, 35, and 36 have the same concept of answers with that of student 5. Their first impression to the teacher's written comment is for the enhancement of their work or output. They saw that feedback is important because it serves as a guide for them to have better output. They also added that it serves as an eye opener for them to see their past mistakes and make them right for future tasks.

Furthermore, I also noticed that they are not only focusing on the comments of the teacher but rather they are also paying attention to the professional and personal attributes of the teacher. As the student # 2 said, "I am happy and I admire my teacher who writes comments. This comment of student # 2 is being attested by student # 22 because she believes that because of the marks seen in her manual, she knew that the teacher read her work.

In addition to this part, students # 25, 29, 30 mentioned that their teacher is impressive and worthy to be appreciated because of her efforts in checking all the manuals of the students. "Despite of her busy schedule, she finds time to give comments to her students' outputs." (Student # 9). "The teacher is good in reinforcement activities." (Student # 27) Student # 31 finds her teacher really supportive, amiable, forthcoming and kind. "Your feedback to us is very inspiring and makes us become better."

In addition, I want to emphasize the answer of student # 33 "It greatly helps us students to know our errors. It checks us our grammar, the same goes with using proper markings (e.g. period, comma etc.). She has the same idea with that of student # 34. Their answers have a connection to the idea of Ferris (2006) that she made a distinction between "treatable" and "untreatable" errors. As I assess my students, they commit "treatable" errors. They are not aware with regard to the verb tense, verb form, subject-verb agreement, articles, pronouns and spelling.

Moreover, student # 7 and student # 10s' first impression to the teacher's comments as that feedback is useful. "It is just like sharing their thoughts towards student's ability", as student #7 mentioned. Others viewed it as cool, advantageous, and they make them aware because of their strengths and weaknesses.

Despite this prevalent recognition of the ability of feedback to make students reflect on their performances, students were very vocal in stating that it was not really good. As I analyzed the transcribed data, I found that despite the positive initial impressions of the students with regard to the student's written feedback considering the professional and personal attributes of a teacher, I noticed that some of the students I interviewed find feedback as a negative one. From their answers, I learned that written comments must be carefully given and the words must be comprehensively chosen. Some got disappointed (student # 13), shocked (student # 16), confused (student # 17), offended (student # 21), nervous, (students # 29 and 30).

Students' overall responses might be very positive on the improvement and usefulness of teacher's written feedback in understanding teacher's expectations; however, it should be noted that when this was specifically asked, students began raising their concerns about feedback and its effectiveness in making them understand teacher's expectations. Majority might have acknowledged its value on this aspect, but some students argued

that the written feedback used in their manuals can still be improved in terms of clarity and comprehensibility. This is true with the idea of Hattie and Timperley (2007) that the main function why there is feedback is to lessen the gap between understanding and performance. They also added that in order to develop students' learning and teacher's feedback, it is of primary significance that teaching must establish definite learning objectives.

In a similar finding, Abdullah and Sidek (2012), Bergh, Ros, and Beijgaard, (2013), and Guasch *et al.* (2013) mentioned that it is essential for teachers to provide feedback which is suited to their stated goals. There should be a match between the teachers' stated goal of objectives and the appropriate type of feedback that teachers have to use. They need to be mindful of the alignment of those things to reach the desired optimum objective. Additionally, it will provide teachers with some understandings on how they are going to effectively assist students in their learning. Likewise, they need to know and analyze their students' weaknesses.

With all of these ideas that surfaced, it is clearly a given that feedback allows students to reflect on their performance by specifically defining their strengths and areas to improve on. Furthermore, it also serves as instruction for them to identify the areas that they need to work on next time when they have to deal with similar output. Clear, brief and comprehensible descriptors are necessary for students to read, appreciate and learn from the performance in indicators stipulated in the feedback given. Thus, the students learn from the comments of the teacher.

Conclusions and Recommendations

The study has shown that feedback improved students' writing. An important thing to note is that the research was facilitated by the classroom teacher so that it could run naturally. The findings in this study may provide teachers with some insights into effective ways of assisting students in learning to analyze their weaknesses and in developing their writing skills. As the concept of Input Hypothesis, teachers will become more conscious of the way they critique students' writing. Teachers will start to pay closer attention to whether or not their criticism is understandable. Being aware of what students need and how they perceive teachers' feedback and error corrections, teachers can create awareness among students in the areas that they need to improve in order for them to take on the challenges of writing in both academic and professional worlds. In an effort to raise students' writing proficiency, it is important that teachers provide feedback that corresponds with their instructional goals. Additionally, teachers should review and consider how they respond as genuine and interested readers.

It seems to be clear that teachers should place an equal emphasis on the different foci, when giving feedback (form and content feedback) so that students can improve other aspects of their writing not just their grammatical or mechanical problems. Panel chairs can step in and reinforce a policy so that form is equal to content in the scheme of work and add more marking criteria to the marking scheme so students have a clearer indication of where to improve either on ideas, organization or grammar.

This study called attention to the various ways that students react when processing the teachers' comments. The results of this study support the notion that teachers should always be aware of and provide what their learners need. This begins with a principle understanding of the goals of writing instruction and the alignment with teachers' feedback focus. If the teacher's instructional goals and feedback focus are in alignment, students

will be more focused and directed to the feedback given, thus, making the feedback more meaningful and useful. Another important point is to ensure an appropriate correspondence between writing approach and its implementation. Once the teacher is clear about his or her writing approach and provides matching feedback, learners will be more likely to benefit most from the writing and correction processes. Correcting or giving feedback is not unidirectional, but rather a shared practice if it is to be optimally effective. Additionally, a process called interaction feedback is required. For the purpose of deciphering students' writing, face-to-face communication is crucial. Because of the conversational changes that give learners the input they require, interaction helps learners develop new skills. As a result, they have more time to consider the information the teachers provide. For both students and teachers, this may result in a greater comprehension.

Therefore, the findings of this study may be useful in providing teachers' insights into how students react to their feedback and as a consequence, enabling teachers to make better feedback decision accordingly. Although students' actual uptake of feedback is sometimes not indicative of the usefulness of the feedback provided, teachers are still considered accountable in helping students to understand how feedback is expected to improve their writing and why teachers need to provide specific feedback. It is recommended to have further studies regarding this topic since this study is limited to a single location and is small in its scope.

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