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

Peer Reviewed Journal

WHAT DO THE ORIGINAL THINKERS SAY ON EDUCATION

"Education is the acquisition of the art of the utilization of knowledge". Alfred North Whitehead in **"The Aims of education" (1985), p 4.**

"Education which every one gets from living with others, as long as he really lives instead of just continuing to subsist, and the deliberate educating of the young". **- John Dewey in "Democracy and Education: An Introduction to the Philosophy of Education" (1915). The Macmillan Company, p 7**

"Education will take the guise of an aid to the psychic development of man and not of making him memorise ideas and facts." **--Maria Montessori in "The Absorbent Mind" (1949), p 40**

"The first principle of true teaching is that nothing can be taught. The teacher is not an instructor or taskmaster, he is a helper and guide. His business is to suggest and not to impose. He does not actually train the pupil's mind, he only shows him how to perfect his instruments of knowledge and helps and encourages him in the process. He does not impart knowledge to him, he shows him how to acquire knowledge for himself. He does not call forth the knowledge that is within; he only shows him where it lies and how it can be habituated to rise to the surface." **- SriAurobindo(India) in The Hour of God p 204**

"By Education I mean an all-round drawing of the best in a child and man—body, mind and spirit. Literacy is not the end of education nor even the beginning. It is only one of the means whereby man and woman can be educated. Literacy in itself is no education." **- Mahatma Gandhi (India) in All Men Are Brothers (Life & thoughts of Mahatma Gandhi as told in his own words) p 170**

"The very reason for nature's existence is the education of the soul; it has no other meaning". **-Vivekanand(India) (Page:178 chapter- looking upon work as worship, book- pathways to joy)**

"The most important attitude that can be formed is that of desire to go on learning." **— John Dewey, Experience and Education p 48**

"There is no such thing as educational value in the abstract. The notion that some subjects and methods and that acquaintance with certain facts and truths possess educational value in and of themselves is the reason why traditional education reduced the material of education so largely to a diet of predigested materials." **— John Dewey, Experience and Education p 46**

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NOTE TO CONTRIBUTORS

The authors are requested to send their articles/papers typed in double space, preferably in the range of **3000 - 4000 words**. Any word, phrase or a sentence given in language, other than English, should be followed by its English translation within bracket. The decision of the Editor-in-Chief will be final. The contributors may ensure that the article is not sent for publication elsewhere. The article, not approved for publication, will be sent back to the author. The author will also be informed, if it is kept in abeyance for the next issue. The author must give details about him-self/her-self at appropriate place, preferably on the last page, after the 'References'.

Notes and References must be given at the end of article/paper as "References" in the universally approved form.

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The views expressed in the articles/papers are the exclusive opinions of the authors and have nothing to do with the ideology or opinions of the Publisher.

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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 July-2024

Section I.

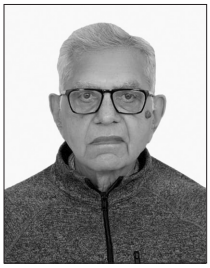
1. Valuing professionalism and training in Teacher Education courses.
2. Changes in perspectives on areas of research in Teacher Education.
3. Perspectives on how learning in Curriculum and Pedagogy are demonstrated in Teacher Certification Programs.
4. Perspectives on effective Evaluation Practices 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
9. Integrating the inputs of Arts, Music and Play during the classroom teaching-learning processes

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

Editorial



It gives me great pleasure, wishing the intellectual fraternity a very-very Happy 2024- with its benevolence of giving an extra day - the 366th in this leap year to add more to the stock of knowledge. The very purpose of this journal is to encourage the authors - both the established, many others who are sailing the similar boats with relatively less experience and the new ones to bring in new ideologies, innovative pedagogy and techniques of trying out new ideas and adding to the existing wealth of knowledge. On one hand, the authors feel the warmth of their intellectual contribution and sharing the same with fellow contributors and on the other, those who consume the knowledge for their intrinsic satisfaction and for using the same in their desired pursuits.

Besides the individual idea-generation, many discoveries and inventions bring forth the positive and negative outcomes that become the sources of debates and again inspiring the research scholars about the beneficial and the alarming implications of the studies. The world has seen the havoc of the atomic energy and later many innovative attempts were made to harness this energy and use it for peaceful and productive uses. The similar is the case of Artificial Intelligence (AI) - its endless uses in facilitating human efforts and at the same time the difficulties and dangerous implications appeared on the surface due its misuse. Personal data in the mischievous hands can have monstrous effects. Some cases of deep-fakes have been observed, inflicting dis-fame to some innocents and creating wrong images in the minds of people. So active measures to safeguard the privacy of the concerned persons and their innovations are of topmost importance. Where, on one hand, innovations of AI are required, on the other hand, attaching safeguards along with innovations are also necessary. A recent AI-related innovative strategy of collaborative teaching takes place - the artificial teacher takes class and a real teacher coordinates and supplements the communication according to the classroom situations. We will welcome such AI related papers in our forthcoming issues, imbibing the role of education in using the positive side of AI.

We do not want to restrict individuals to think in a particular domain only. They have their own priorities and may engage themselves in their particular areas of interest. They may concentrate on any area of educational interest in teacher or school education. They may develop their insights in foundational areas of Philosophy, Psychology, Sociology, etc. or the pedagogic areas and develop articles/papers accordingly. We do not claim that each paper published in IJTET is of the superlative quality and there cannot be better pieces in those domains. We encourage the relatively new authors also and if the contributed paper has some deficiency, due opportunities are given to such authors to bring the same up to the publishable norms. If they follow the instructions of our learned referees and bring in the necessary improvements, we do entertain their attempts.

As usual, this time also, a large number of papers were received for the January 2024 issue. Each paper, falling in the domain of teacher education and school education, was reviewed and those strongly recommended by our referees could find a place for the present issue. Our policy is not to out rightly reject the faulty papers. We give opportunities to those authors also who intend to bring in improvements in their creations as suggested by our reviewers and then select the best ones according to the criteria laid down for the approval of the papers.

A long list of themes were suggested for developing the papers for the current issue. Accordingly, many papers were received, even beyond the suggested areas and each relevant paper was reviewed. These days, much emphasis is being given to STEM education. In this connection, a paper published in this issue "Fostering Stem Literacy through Educational Robotics : An Experiential Learning via STEM Carnival", has been acclaimed as 'excellent' by the concerned reviewer and therefore has been given a place in this issue. "Holistic Education" is also being much talked of and being emphasized by educationists and national policies of education in different countries. Its attainment has almost earned the status of an educational revolution the world over. Besides the role of school, the duty of home and society for its inculcation cannot be undermined. In this connection, the paper "The Role of Parental Involvement in Education" has been found suitable for the current issue. Some other papers, like "Employing Collaborative Strategies to improve Action Research Engagement of Teachers and School Heads", and "A Descriptive Study on the Challenges and Interventions of Traditional vs Online Learning during the Covid-19 Pandemic" have earned laurels

by the reviewers. Similarly other papers and articles could find a place in the current issue because of the approval by the respective referees.

The editorial board has been trying to approach schools in different countries to undertake projects in the field of improving students' all-round development, but its success has remained inconclusive. It will continue contacting and guiding the concerned school-academicians and administrators to engage themselves in such endeavors, pen down their attempts and send their reports to be enshrined along with many other rich papers and articles in our journal.

At the dawn of the new year - 2024, the editorial and the advisory board wish that all our worthy associates, viz the authors, reviewers and the subscribers remain fit and cheerful and remain associated with us and our journal enthusiastically.

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

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RESEARCH ARTICLES

Fostering Stem Literacy through Educational Robotics: An Experiential Learning via Stem Carnival

Ong Sing Ling, Marcella Peter, Nur Atiqah Zaini, Khairunnisa Ibrahim and Jill Ling

Abstract

The integration of Educational Robotics (ER) in Science, Technology, Engineering and Mathematics (STEM) education has garnered attention for its positive impact on students' holistic learning experiences. However, the incorporation of "T" (Technology) discipline of STEM often face limitations due to financial constraints and resource scarcity. This study aimed to explore the potential of ER in fostering STEM literacy and soft skills among students, utilising a STEM Carnival as an engaging platform. The research was conducted at SMK Rosli Dhoby in Sibu, Malaysia, and involved students from Form 1 to Form 6 in the Malaysian secondary school. This research employed a quantitative approach using a questionnaire administered to one hundred fifty participants obtained through random sampling. The findings revealed a significant positive impact of ER on fostering STEM knowledge and 21st-century skills. A Chi-square test was employed to examine gender differences in prior exposure to robotics before the STEM Carnival, indicating a significant association with interest in Technology but not with Science and Mathematics. A majority of participants expressed a keen interest in exploring ER and engaging in STEM fields beyond the event. This study offers valuable insights for educators, policymakers and event organisers promoting STEM education through ER.

Keywords: Educational Robotics, Experiential Learning, Holistic Learning, STEM Carnival, STEM Literacy

Introduction

Educational Robotics (ER) represents an evolving interdisciplinary learning environment based on the use of robots and electronic components. It harnesses experiential learning methodologies to enhance the educational experience with student engagement and fosters the development of STEM literacy and various soft skills towards holistic learning. Holistic learning refers to an educational approach that acknowledges the interconnectedness of numerous aspects of learning rather than focusing solely on individual subjects or isolated skills. It is relevant to ER, where holistic learning happens because the emphasis is on nurturing cognitive, emotional, social and physical abilities, and creativity.

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ER has gained considerable traction in research and education, with educators increasingly adopting robotics as a pedagogical tool to teach STEM subjects (Anwar et al., 2019; Sapounidis & Alimisis, 2020; Theodoropoulou et al., 2021). ER integrates education theories and robotics to offer students experiential learning experiences, utilising robots and related technology to convey concepts from various disciplines within engaging and interactive learning environments to simulate real-world challenges (Ching & Hsu, 2023). Experiential learning is an educational approach that focuses on learning through direct and hands-on experience rather than relying solely on traditional methods such as lectures or textbooks. Experiential learning in ER encourages learners to explore, reflect, and apply their knowledge in real-world situations characterised by hands-on activities, experiments, fieldwork and simulations that foster STEM literacy. STEM literacy refers to a person's ability to understand, engage with, and apply concepts from Science, Technology, Engineering, and Mathematics (STEM).

Over the years, ER has gained popularity for its role in cultivating the 4Cs: Critical thinking, Creativity, Communication and Collaboration among students. However, despite the growing interest and efforts in ER, its adoption can be hindered by cost disparities, which depend on factors such as the robotics type, complexity, and the resources required for effective implementation, guidance, and collaboration (Bers et al., 2019; Sapounidis & Alimisis, 2020; Wang et al., 2020).

This study aimed to address the challenges and explore the potential of ER in fostering STEM literacy through STEM Carnival. A STEM Carnival is an event with a variety of hands-on exhibits, interactive demonstrations, games, and activities that showcase the elements of Science, Technology, Engineering, and Mathematics (STEM) with the interactive atmosphere of a carnival to make STEM subjects engaging, entertaining, and accessible to the students and the public. Specifically, the study investigated the use of the STEM Carnival as an engaging platform for ER exploration. Additionally, it examined potential gender differences whether varying interests in Science, Mathematics, or Technology among genders impact this experience. Notably, this study responded to the common constraints encountered by schools in acquiring ER, thereby promoting holistic and experiential STEM education through STEM Carnival. Therefore, the research addressed the following questions:

1. How does Educational Robotics (ER) contribute to STEM literacy within the context of a STEM Carnival?
2. Are there gender-based disparities in the experiential learning experience when using ER?
3. Do differences in interests related to Science, Mathematics or Technology influence the experiential learning experience when using ER?

Literature Review

The rise of Industrial Revolution 4.0 and the increasing reliance on the digital economy drive the need for a new set of skills, especially in robotics for the young generation (Adnan et al., 2023). Previous research has found that Educational Robotics (ER) facilitates students' cognitive learning of STEM knowledge, problem-solving skills, computational thinking and soft skills, such as teamwork and social skills, as well as affective domains including attitudes and interests towards STEM subjects and careers (Hudson et al., 2020; Ong & Ling, 2020). ER can serve as a promising approach to enable students to foster STEM literacy because learning becomes more interactive and hands-on (Bers et al., 2019; Ching et al., 2018).

The potential of ER for experiential learning involves active engagement through hands-on activities with problem or project-based learning that encompasses computational thinking (Ong et al., 2022). Students collaborate in designing, building, and programming robots to perform specific tasks, allowing them to apply theoretical knowledge in a tangible and meaningful way. These activities provide a platform for students to learn by doing, fostering creativity, innovation, and the essential teamwork and communication skills. The development of experiential learning methodologies is gaining attention due to their contributions to enhancing the quality of education by building competencies and values. The interdisciplinary nature of ER accommodates a coherent interactive design process that facilitates innovation and develops various skills by adopting experiential learning approaches (Abidin et al., 2021; Habib et al., 2021). ER emphasises the interconnectedness of disciplines, such as engineering, computer science, mathematics, and design. ER and cooperative learning are more effective in stimulating the interest and motivation of students (D'Amico et al., 2020).

According to a study by Kucuk & Sisman (2020), female students had significantly less desire and confidence to learn robotics than male students. However, there was no gender effect on computational thinking and teamwork. Despite the investment in STEM areas for ER as a way to intensify innovation and bring positive learning impact, STEM learning in schools appears to be struggling and inconvenient due to the high costs (Castro et al., 2018; Ong & Ling, 2020). Therefore, the accessibility of low-cost ER and other alternative robotics needs to be further explored.

Methodology

Robotics and Designs

The Sphero BB-8 robots and self-designed robotic cars were used for Educational Robotics (ER) activities during the STEM Carnival. The BB-8 droid, as seen in Star Wars movie, is a type of astromech droid. These BB-8 robots can be controlled using smartphones or tablets through apps or coding, enabling users to control their movement, sounds, and rotating heads. Six BB-8 units and six units of low-cost, self-designed robotic cars powered by the Arduino platform were brought to the STEM Carnival. Multiple robotic maps, with different paths and challenges, were created to enhance ER activities during the STEM Carnival. Participants were tasked with completing challenges and objectives through the exploration of ER. Participants were challenged to complete tasks and achieve the objectives set through the ER. Before engaging in the ER activities, the participants were briefed on the basic operations of BB-8 robots and robotic cars.

Participants

The study focused on a sample of one hundred fifty secondary school students from SMK Rosli Dhoby in Sibu, Sarawak, Malaysia. The participants enrolled in Form 1 to Form 6 fell within the age range of 13 to 19 years old.

Instrument

This study employed a quantitative approach, involving the administration of a questionnaire which was adapted from the BioRobotics Institute in Italy (Castro et al., 2018) to participants following their engagement in the ER exploration activities. Its purpose was to assess the outcomes of this innovative implementation of ER activities during the STEM Carnival. The questionnaire comprised five sections. Section A collected

the participants' demographic data. Sections B and C assessed students' exploration experiences from the BB-8 and robotic cars ER activities. These sections included seven items each, and participants rated their responses on a four-point scale (4 = Strongly Agree; 3 = Agree; 2 = Disagree; 1 = Strongly Disagree). Notably, a neutral category was deliberately omitted to encourage respondents to make either positive or negative evaluations. Section D consisted of four multiple-choice questions designed to gauge participants' awareness and knowledge of robotics. For example, "What is the function of a robotics processor?" (a) the heart and brain of the robot, (b) the process of reaching a solution, (c) the computer, or (d) the component of the robot responsible for executing the program. Section E encompassed three questions focused on participants' motivation in robotics.

Results

A total of one hundred and fifty participants voluntarily completed the questionnaire. Descriptive statistics were employed to process the data, utilising IBM Statistical Package for Social Sciences (SPSS) software version 25. Cronbach's alpha coefficient was employed to determine the reliability of the questionnaire items within each construct. As a general guideline, a Cronbach's alpha value of 0.7 or higher is indicative of an acceptable level of reliability (Santos, 1999).

Data Analysis

Descriptive Analysis

The demographic data, encompassing gender, age, level of study, and race, were recorded and presented in Table 1. Regarding their interest in Science, 136 respondents (90.7%) indicated a positive interest, while 14 respondents (9.3%) expressed no interest. Surprisingly, only 85 respondents (56.7%) reported a liking for Mathematics, while 65 respondents (43.3%) expressed a dislike for the subject. A significant majority of the participants, totalling 133 individuals (88.7%), conveyed their fondness for technology, with 17 respondents (11.3%) indicating otherwise. In response to whether they had prior exposure to robotics before the STEM Carnival, 84 respondents (56%) affirmed their previous experience, while 66 respondents (44%) had not been previously exposed to robotics. Nearly all respondents, comprising 147 individuals (98%), expressed their enjoyment of the robotics activities when given the opportunity at the STEM Carnival.

In Table 2, the questionnaire items were coded into three categories: BB-8 Exploration Learning Experience (B), Robotic Car Exploration Learning Experience (C), and Motivation in Robotics (M). From the data analysis, it was found that a significant majority of the respondents either agreed (63.3%) or strongly agreed (32.7%) that they had successfully explored the operations and movements of the BB-8 robot using the Sphero BB-8 app. The respondents expressed high levels of enthusiasm and engagement with BB-8 robotics, with 39.3% in agreement and 58.7% strongly agreeing, as opposed to robotic cars, where 48% agreed and 50% strongly agreed. This observation indicated that a majority of the respondents exhibited a strong attraction to both. These findings aligned with the notion that the use of both BB-8 robotics (38% agreed and 60.6% strongly agreed) and robotic cars (41.3% agreed and 57.4% strongly agreed) was perceived as enjoyable and conducive to STEM learning.

Table 1 Demographic analysis of respondents

Characteristics	Categories	Frequency	Percentage (%)
Gender	Male	75	50.0
	Female	75	50.0
Age	13	8	5.3
	14	45	30.0
	15	30	20.0
	16	26	17.3
	17	17	11.4
	18 and above	24	16.0
Level of study	Form 1	8	5.3
	Form 2	48	32.0
	Form 3	29	19.3
	Form 4	25	16.7
	Form 5	18	12.0
	Form 6	22	14.7
Race / Ethnic group	Malay	34	22.7
	Chinese	17	11.3
	Indian	1	0.7
	Iban	65	43.3
	Melanau	22	14.7
	Bidayuh	5	3.3
	Other	6	4.0
Do you like Science?	Yes	136	90.7
	No	14	9.3
Do you like Mathematics?	Yes	85	56.7
	No	65	43.3
Do you like Technology?	Yes	133	88.7
	No	17	11.3
Any exposure to robotics before this STEM Carnival?	Yes	84	56.0
	No	66	44.0
Do you enjoy playing with robotics if you are given the opportunity?	Yes	147	98.0
	No	3	2.0

Table 2 Items in the questionnaires

Code	Items	1 Strongly Disagree (%)	2 Disagree (%)	3 Agree (%)	4 Strongly Agree (%)
	BB-8 Exploration Learning Experience (B)				
B1	BB-8 exploration during the STEM Carnival helps me in exploring the operations and movements of BB-8 via Sphero BB-8 app.	2.0	2.0	63.3	32.7
B2	BB-8 exploration during the STEM Carnival gives me an awareness to the functions of BB-8 via the Sphero BB-8 app.	1.3	8.0	60.0	30.7
B3	I am excited to see BB-8 robotics because it is attractive and engaging.	0.0	2.0	39.3	58.7
B4	Learning BB-8 robotics is fun and happy.	0.7	0.7	38.0	60.6
B5	I am curious about how BB-8 works.	0.7	6.0	53.3	40.0
B6	I am interested to know the electronics components (e.g. sensor for detection, LED for lighting, buzzer for sound, motor for moving) of the BB-8.	1.3	5.3	54.0	39.4
B7	The BB-8 robot triggers me to think and solve the challenges to reach a goal.	0.7	2.0	49.3	48.0
	Robotic Car Exploration Learning Experience (C)				
C1	Robotic car exploration during the STEM Carnival helps me in exploring the operations and movements of the robotic car.	1.3	1.3	59.3	38.1
C2	Robotic car exploration during the STEM Carnival gives me an awareness of the functions of the robot car.	0.0	8.6	58.7	32.7
C3	I am excited to see robotic car because it is attractive and engaging.	0.7	1.3	48.0	50.0
C4	Learning robotic car is fun and happy.	0.0	1.3	41.3	57.4
C5	I am curious about how robotic car works.	1.3	5.3	43.3	50.1
C6	I am interested to know the electronics components (e.g., sensor for detection, LED for lighting, buzzer for sound, motor for movement) of the robotic car.	0.7	5.3	51.3	42.7
C7	The robotic car triggers me to think and solve the challenges to reach a goal.	0.7	0.7	50.6	48.0
	Motivation in Robotics (M)				
M1	I would be eager to learn more with robotics, for example, coding with robotics.	0.7	2.0	56.0	41.3
M2	I would be eager to assemble a robot.	2.7	4.0	70.0	23.3
M3	Learning robotics motivates me to continue my studies in STEM programmes, such as Computer Science, Electronic Engineering or technology-related programmes.	0.7	1.3	57.3	40.7

A striking 97.3% of the respondents either agreed (49.3%) or strongly agreed (48%) that they were prompted to engage in critical thinking and problem-solving as they navigated the challenges presented with BB-8 robotics to achieve their objectives. In contrast, when employing robotic cars as a tool, 50.6% agreed, and an additional 48% strongly agreed with this approach to engage their analytical and problem-solving skills. A majority of respondents, comprising 43.3% who agreed and 50.1% who strongly agreed, expressed their curiosity about the inner workings of the robotic car. Furthermore, a substantial 94% of respondents, with 51.3% in agreement and 42.7% strongly agreeing, conveyed their keen interest in understanding the electronic components (e.g., sensors for detection, LEDs for lighting, buzzers for sound, motors for movement) used in the robotic car.

The findings highlighted the beneficial influence of robotics in cultivating STEM literacy among students. The students exhibited a strong enthusiasm for deepening their understanding of robotics, encompassing coding and assembly aspects. Remarkably, an overwhelming 98% of the respondents either agreed (57.3%) or strongly agreed (40.7%) that their experience in learning robotics served as a motivation to pursue future studies in STEM programmes, including Computer Science, Electronic Engineering, Mechanical Engineering, or other technology-related fields.

The results from the Chi-square test revealed several insights. Firstly, there was no statistically significant association between gender and prior exposure to robotics before the STEM Carnival, as evidenced by a p-value of 0.0908, which was greater than the conventional significance level of 0.05. Secondly, the examination of whether a significant association existed between gender and interest in Science impacting ER exploration yielded a p-value of 0.102, also exceeding the significance threshold. Consequently, no significant association was found between gender and interest in Science concerning ER exploration. Similarly, when investigating the association between gender and interest in Mathematics affecting ER exploration, the p-value obtained was 0.250, which indicated the absence of a significant association. However, the analysis took a different turn when probing the relationship between gender and interest in technology during ER exploration. In this case, the p-value was 0.000, which was less than the threshold, revealing a significant association between interest in technology and gender.

Reliability Analysis

A reliability analysis using Cronbach's Alpha was conducted and the results are presented in Table 3. It is noteworthy that all the constructs achieved a minimum Cronbach's Alpha value of 0.700, indicating that the data's reliability can be deemed satisfactory.

Table 3 Cronbach alpha

Construct	Alpha
BB-8 Exploration (B)	.835
Robotic Car Exploration (C)	.889
Motivation in Robotics (M)	.718

Discussion

Despite some limitations, the introduction of Educational Robotics (ER) through the STEM Carnival platform emerges as a viable solution to schools. This approach effectively exposes students to robotics and fosters STEM literacy through experiential learning. The STEM Carnival featured interactive exhibits and hands-on activities centered on ER, offering participant's valuable opportunities to actively engage with the 4Cs: Collaboration, Communication, Critical thinking and Creativity. This not only enhances students' understanding of robotics but also promotes the development of problem-solving skills. These findings align with the research by Theodoropoulou et al., 2021, which suggested that ER plays a vital role in nurturing 21st-century skills and can be effectively integrated into teaching various subjects across different educational levels. Furthermore, the study echoes the effectiveness of ER in providing impactful learning experiences, enhancing students' learning and transfer skills, fostering creativity and motivation, and promoting diversity and broader participation, as documented by Anwar et al. (2019).

The findings from this study revealed that factors such as prior exposure to robotics, interests in Science and Mathematics, as well as gender, did not significantly impact ER learning. In contrast, a strong interest in Technology emerges as a key influencer in ER exploration. This suggests that possessing a proclivity for technology provides an advantage in mastering ER concepts and applications. ER plays a pivotal role in stimulating curiosity, deepening students' comprehension of STEM concepts, and bolstering their motivation to engage in STEM learning. Moreover, the collaborative nature of ER activities fosters the development of teamwork and communication skills, aligned with the insights offered by Eguchi (2014).

Learning through ER entails a holistic understanding of interconnected disciplines combined with hands-on experiential learning. This approach cultivates a profound comprehension of robotics concepts and equips students with practical skills essential for navigating the ever-evolving technological landscape. Students are encouraged to delve into the foundational principles underpinning robotic systems, enabling them to perceive the larger framework and recognise the intricate interplay among different components. This comprehensive perspective contributes to a deeper understanding of robotics, thereby promoting critical thinking and problem-solving skills, as emphasised by Ching et al. (2019). The engagement of students in hands-on learning scenarios can significantly ignite their STEM interest and literacy. Figures 1 and 2 show the visual representation of the BB-8 robotics and robotic cars exploration activities conducted during the STEM Carnival.

Figure 1. BB-8 Robotics Exploration.

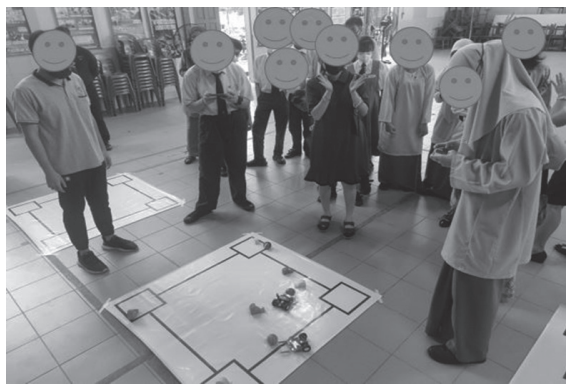

Figure 2. Robotic Cars Exploration.

Conclusions

In conclusion, this study addressed three objectives: to explore ER's potential in fostering STEM literacy while stimulating students' awareness and curiosity through STEM Carnival interventions, to examine gender differences in ER learning experiences, and to understand how students' interests in various subjects impact the ER learning process. Acknowledging the financial and resource constraints faced by schools, this study proposed the utilisation of a STEM Carnival as a practical and effective platform for introducing ER. The findings confirm that ER has potential for fostering STEM literacy and enhancing soft skills among students. Furthermore, it has been established that there was no significant association between gender and prior exposure to robotics or interests in Science and Mathematics in ER exploration. However, a significant association was observed between interest in Technology and gender. These insights underline the ER's effectiveness as an educational tool in stimulating students' interest in STEM subjects and promoting valuable 21st-century skills.

It is recommended to conduct experimental studies during STEM Carnivals utilising pre- and post-tests to assess the improvement in ER exploration among students comprehensively. In addition, investigating students' perceptions of their learning experiences, including the challenges and benefits of collaborative work and the use of various ER platforms, could yield valuable insights. Addressing observations and feedback from participants would further enrich future research. Moreover, future studies may benefit from adopting longitudinal designs to investigate the long-term effects of ER learning approaches on students' learning outcomes and attitudes. This would provide a more in-depth understanding of the sustained impact of ER.

ER emerges as an innovative learning method well-suited for self-directed learners who exhibit flexibility in their knowledge acquisition. They thrive in adaptable learning environments, employ critical thinking, and excel in learning through exploration. The insights gleaned from this study can serve as a valuable resource for educators and policymakers alike when designing and implementing relevant courses and initiatives. By harnessing the power of ER, educators can cater to the needs of a diverse range of learners and foster a deeper engagement with STEM subjects, ultimately paving the way for a brighter future in education.

Acknowledgements

The authors wish to thank all the teachers of SMK Rosli Dhoby for the invitation to participate in the STEM Carnival and the students who participated in the ER activities for making this study possible. The authors also extend their gratitude to the Design and Technology Centre (DeTeC) and the Centre on Technological Readiness and Innovation in Business Technopreneurship (CONTRIBUTE) of the University of Technology Sarawak (UTS) for supporting this research.

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The Role of Parental Involvement in Education

Dr. Shyam Sundar

Abstract

The study aims to investigate the significance of parental involvement in their offspring's education. Children's academic success has been greatly influenced by parental participation. It promotes a nurturing environment for learning in the child's household. However, a child's educational journey is significantly shaped by the home learning environment, which has a well-documented impact on children's academic success.

The primary data collection technique has been employed in this study; hence, a survey was conducted using Google Forms with a questionnaire consisting of thirteen questions and three demography-related questions. From the data analysis through SPSS, the "p-value" of the variables of 0.000 signifies that the variables studied in this correlation study are strongly correlated; hence, the alternative hypotheses are accepted. Acknowledging the consequences of this environment and encouraging procedures that authorise parents to design a supportive and stimulating learning space is crucial for boosting academic success among children.

In conclusion, parental involvement in school and how it affects students' academic achievement cannot be overstated. A thorough investigation has indicated that proactive parental involvement creates a positive learning atmosphere, improves academic performance, and helps ensure a child's long-term success.

Keywords: Parental Involvement, Education, Academic Achievement, Home Learning Environment, Parent-Child Communication

Introduction

Education is a cornerstone of personal and societal development, promoting knowledge, critical thinking, and the evolution of fundamental skills. According to Barger et al. (2019), parental involvement in their children's education plays a significant role in determining the quality of education and the actions of educators and institutions. The concept of parental participation in education is complex and encompasses a wide range of actions, viewpoints, and activities that parents engage in to learn about their children's academic experiences. Over the decades, studies have shown that parental involvement has been crucial in shaping a child's educational outcomes. As per the statement of *Ishimaru (2019)*, it stretches beyond simply administering homework or attending parent-teacher meetings. It involves building a supportive home environment, setting effective communication channels, and supporting educational excellence. Parental participation enhances children's academic performance and overall educational knowledge.

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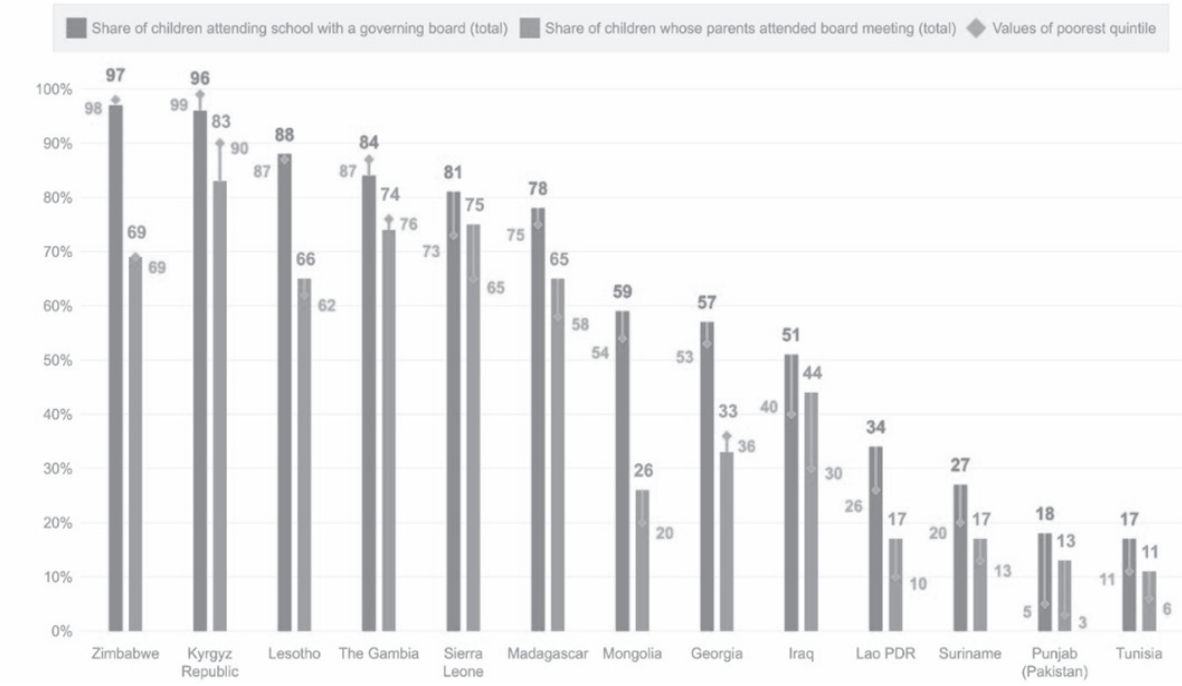

Figure 1: Parental involvement in children's learning
(Source: UNICEF, 2023)

The above figure displays parental participation in children's learning across the different regions of the world. According to UNICEF's MICS6 surveys, parental engagement levels in schools vary greatly and are greatly influenced by the presence or absence of governing boards in the schools. It clarifies institutional structures' role in encouraging or impeding parental involvement in schooling. Almost every student in countries like Zimbabwe and the Kyrgyz Republic attended schools with governing bodies. Conversely, in Tunisia and Punjab (Pakistan), less than 20% of children attend schools using these kinds of boards. This research emphasises how crucial school governance systems have been in determining how parents participate in their children's education. It highlights the need for educational policies that support and foster parental involvement at the institutional level since this will ultimately improve student outcomes and educational quality.

The significance that parental engagement plays in their kids' education is examined in this research.

Objectives

The following covers this study's primary objectives.

1. To investigate how parental participation affects children's academic achievement
2. To investigate the impact of children's home learning environment on their academic performance.
3. To draw attention to the relationship between children's academic achievement and their social environment.
4. To assess how parent-child communication contributes to children's educational performance.

Research Questions

The following highlights some of the questions that have been generated to direct this investigation.

1. What effect does parental participation have on kids' academic success?
2. What impact does a child's home learning environment have on their academic achievement?
3. What connection exists between children's academic achievement and their social status?
4. How does parent-child communication affect a child's ability to succeed in school?

Hypotheses

The important hypotheses developed from the questions and objectives related to parental involvement in education are underpinned below.

H_1: Raised parental involvement positively influences higher academic attainment in children.

H_2: A facilitative home learning environment positively correlates with children's academic attainment.

H_3: Higher socioeconomic status is correlated with enhanced academic attainment in children.

H_4: Effective parent-child communication significantly affects the academic attainment of children.

Gender disparities in parental participation in education are an essential issue in the broader topic of parental involvement. This issue underscores disparities in how parents are usually perceived and motivated to participate in their children's educational expedition. As per the consideration of *Silinskas & Kikas (2019),* traditionally, there has been a gendered split of roles in parenting, where mothers have been more closely linked with nurturing and educational support, while fathers have been more attentive to supplying financial support. This conventional division of roles can lead to distinctions in how mothers and fathers are immersed in their children's education. As per the conception of *Bond and Bedenlier (2019),* there are disparities in academic attainment between boys and girls, with one gender beating the other in distinct subjects or domains. These differences can have long-term implications for educational and career prospects.

The below figure has articulated the gender disparities in educational attainment worldwide by the year 2020. As per the Global Gender Gap Report 2020, disparities exist in educational attainment between males and females. While 91 per cent of males worldwide had attained primary education, slightly fewer females, at 88 per cent, had attained the same level of education. The disparity between the genders in primary school accomplishment may have an impact on how different genders of parents approach and engage with their kids' education. The Global Gender Gap Index, which benchmarks gender disparities in different fields, including education, economic participation, health and political empowerment, highlights the significance of addressing gender inequalities on a broader scale. In the year 2020, Iceland appeared as the leading nation with a score of 0.87, indicating a moderately smaller gender gap across these areas.

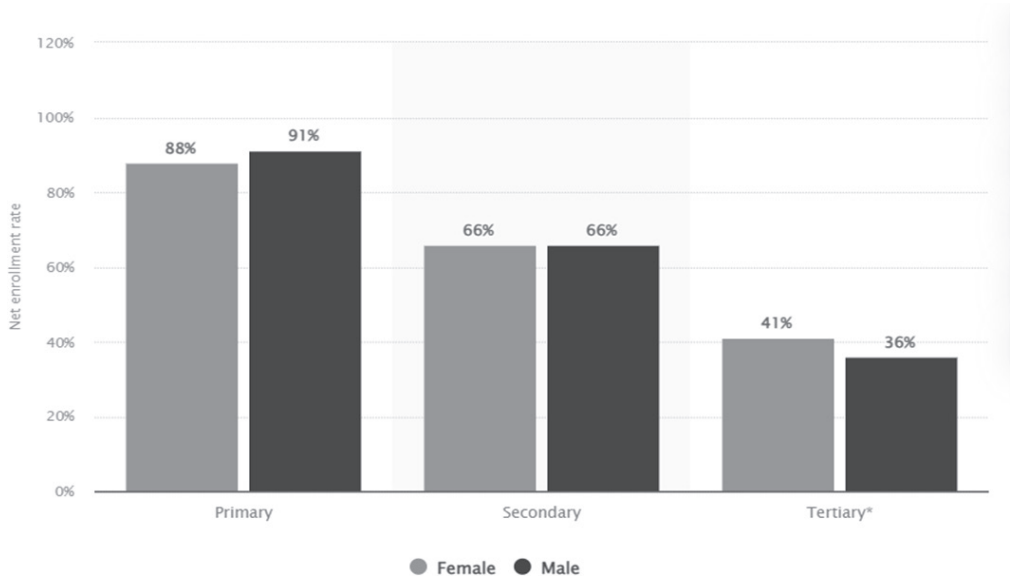

Figure 2: Gender disparities in educational attainment worldwide, 2020
(Source: Statista, 2023)

Literature Review

Impact of Parental Involvement on the Academic Attainment of Children

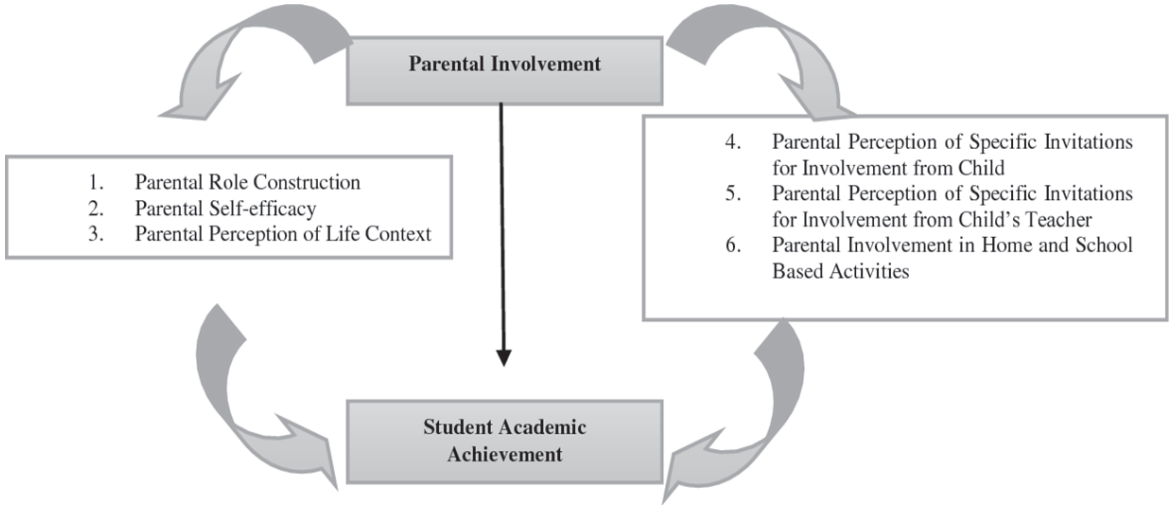

Figure 3: Academic achievement and parental participation concerning each other
Source: Influenced by (*Netolicky, 2020*)

Parental participation has played a vital role in shaping children's academic performance. As per the view of *Netolicky (2020),* parental participation promotes a supportive learning atmosphere at home. Parents who encounter educational activities, such as reading with their kids, supporting them with homework, and discussing school topics, form an environment where learning is esteemed and cultivated. This early orientation to learning experiences at home can lay a firm basis for a child's academic journey. Furthermore,

active parental involvement rises to school-related activities. As per *Owusu-Fordjour, Koomson, and Hanson's (2020)* statement, observing parent-teacher conferences and school meetings and participating in parent-teacher collaborations permits parents to stay informed about their child's improvement, stability and areas requiring modification. This communication channel between parents and educators is crucial for promptly specifying and managing educational requirements.

Influence of the Parental Learning Environment on the Academic Performance of Children

One well-established and crucial factor in determining a child's educational path is the effect of the home learning environment on academic success. As per the consideration of *Silinskas and Kikas (2019),* this sophisticated environment contains a degree of features within the home that can significantly influence a child's academic achievement. The presence of a facilitative home learning environment makes an environment that promotes a love for learning. Children with access to educational resources and a peaceful space for studying or reading have more potential to encounter academic activities *(Garbe et al. 2020).* This early orientation to a supportive learning environment can set the setting for a lifelong adoration for knowledge.

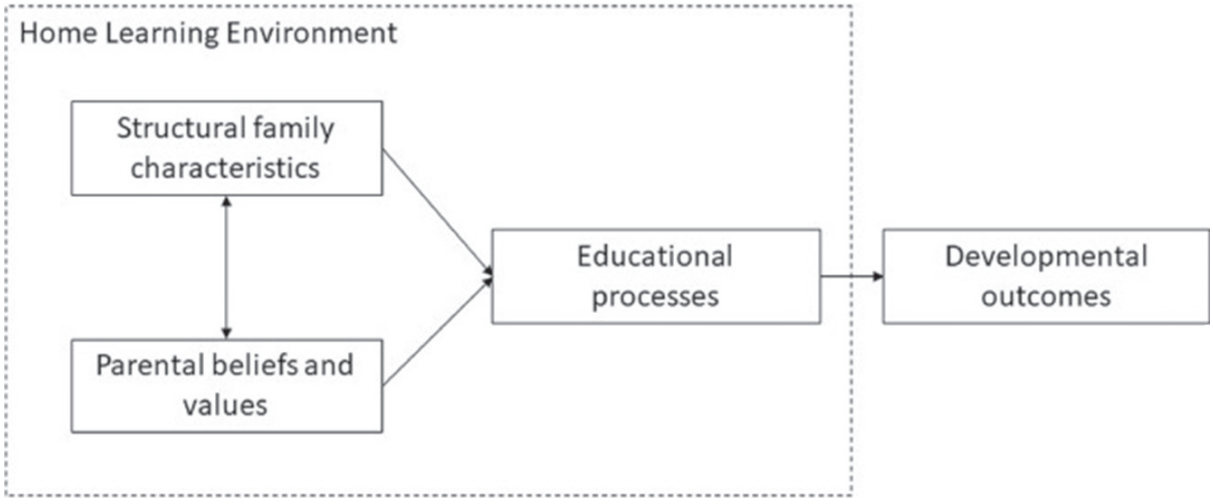

Figure 4: Home learning environment on the academic performance
(Source: Influenced by Romero et al. 2020)

Moreover, parents who vigorously commit to their children's learning at home have played a critical role in improving academic performance. As per the consideration of Romero et al. (2020), reading to young kids, supporting them with homework, and immersing them in educational games all contribute to a child's cognitive development and academic readiness. These interchanges not only strengthen classroom learning but also reinforce the parent-child bond. Beyond the physical resources and interactions, parents' perspectives and anticipations concerning education are essential. Parents who highlight the significance of education and set high expectations for their children's academic success build a motivational atmosphere. When children feel that their parents value education, they have more potential to invest effort into their studies, set objectives, and seek excellence.

Relationship between Socioeconomic Status and the Academic Attainment of Children

The relationship between socioeconomic status (SES) and children's academic attainment is a complicated and broadly studied phenomenon. SES, generally defined by factors such as income, education, and parents' occupation, substantially impacts a child's educational journey and results. As per the comment of *Owusu-Fordjour, Koomson, and Hanson (2020),* one of the most prominent aspects of this correlation is the influence of SES on access to educational resources. Families with higher SES usually have more economic means to supply their children with a spectrum of educational possibilities. These benefits can have a direct influence on the academic performance of the child. Moreover, SES can influence the resilience and quality of a child's home environment. Spinelli et al. (2021) state that families with higher SES have more prominent access to safe and sound housing, nutritious meals, and healthcare. These elements can contribute to a child's well-being and willingness to understand. Contrarily, children from lower SES environments may face more notable difficulties regarding housing fluctuation, food insecurity, and narrow access to healthcare, impacting their ability to concentrate on their studies.

Socioeconomic status has also played a crucial function in the availability of enrichment possibilities outside of school; as per the statement of *Kaden (2020),* kids from higher SES families are more likely to participate in activities that improve their cognitive as well as social development, such as music lessons, sports, and several cultural experiences. These adventures can boost aptitudes worthwhile for academic success, such as time management, discipline, and critical thinking. As *Galindo, Sonnenschein, and Montoya-Ávila (2019)* demonstrated, SES can impact parental involvement in education. Parents with higher SES usually have more adaptable schedules and resources to encounter in their children's education actively. They may minister to parent-teacher conferences, volunteer at schools, as well as deliver academic reinforcement at home. This raised involvement can positively influence a child's motivation, self-esteem, as well as academic performance.

Relevant Theory

Walberg's theory of academic achievement

Walberg's theory, usually called the "Educational Productivity Model", delves into the sophisticated factors contributing to educational success. While this theory contains different features, it aligns significantly with the topic of academic achievement and its support. As per the view of Bol (2020), individual student features have played a key role in educational attainment. These features contain cognitive capabilities, stimulation, prior knowledge, and self-regulation. Learners who maintain solid cognitive skills, inherent motivation, and productive study habits have more potential to excel academically. In the topic context, comprehending and nurturing these student-centred facets is critical to encouraging academic success. Guhn, Emerson, and Gouzouasis (2020) emphasised the significance of the home environment in sustaining academic achievement. Characteristics such as parental involvement, socioeconomic status, and the availability of educational resources at home greatly impact a child's willingness to learn. Parental involvement is committed parents can improve their child's academic journey via support, guidance, as well as incentive.

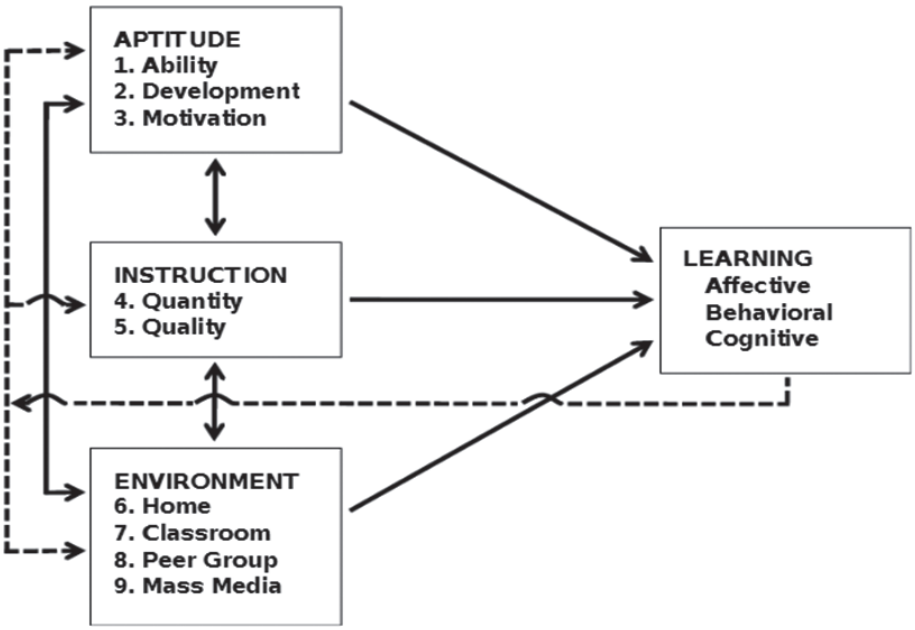

Figure 5: Walberg's theory of academic achievement
(Source: Influenced by Bayrakdar & Guveli, 2020)

According to the theory, effort and time are crucial determinants of academic achievement. This aligns with the knowledge that maintaining effort, practice, and time devoted to education are fundamental to success. It highlights the significance of perseverance and responsibility in achieving academic goals. As per the comment of Bayrakdar and Guveli (2020), this theory emphasises the function of anticipation and feedback in designing academic performance. When teachers set high anticipations for learners and deliver constructive feedback, learners are encouraged to seek excellence. This element echoes the topic, as parental and teacher anticipations can significantly influence a child's academic motivation and self-belief.

Methodology

Data Collection

The "primary data collection" technique has been employed in this study due to several reasons. A survey was conducted using Google Forms with a questionnaire consisting of thirteen questions and three demography-related questions.

This data gathering is crucial as it delivers authentic, accurate, and context-specific data and information essential for studies, decision-making, and problem-solving. As per the notion of *Al-Ababneh (2020),* it provides data accuracy and relevancy by authorising investigators to develop data collection procedures aligned with their goals. This fresh data equips precise acuities, grabs real-time information, and contributes to the growth of new learning, making it necessary in fields varying from academia to trade as well as policymaking *(Ayed et al., 2019)*. In this context, this method has proposed a complete insight into parental involvement, analysing its nuances and developing valuable data to inform approaches to improve children's educational experiences through enhanced parental engagement.

Data Analysis

In this study, "quantitative data analysis" through "SPSS" has been preferred because it is a systematic method of analysing numerical data to extract meaningful perspicuity and draw conclusions. As per the view of *Al-Ababneh (2020),* this method has allowed investigators to create evidence-based decisions, this analytical approach has delivered empirical proof of the correlation between parental involvement and academic outcomes, contributing to a more in-depth acquaintance of the topic and informing evidence-based educational policies and practices.

Findings

Demographic Characteristics of the participants

Gender

1. What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	20	36.4	36.4	36.4
	Male	25	45.5	45.5	81.8
	Prefer not to say	10	18.2	18.2	100.0
	Total	55	100.0	100.0	

Table 1: Frequency of gender distribution (Source: SPSS)

As per the above figure, the "demographic analysis" displays a remarkable "gender distribution" among the participants in this study, which aligns with the topic of parental involvement's role in children's education. Twenty of the fifty-five respondents were recognised as female, while twenty-five were considered male. On the other hand, 10 participants decided not to uncover their gender preferences. This balanced gender model assures that this study's findings contain diverse viewpoints, mirroring the diverse viewpoints on parental involvement in children's educational attainment.

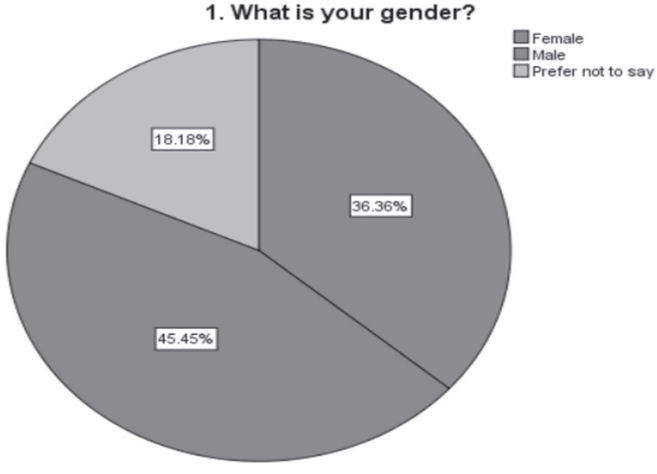

Figure 6: Percentage of gender distribution (Source: SPSS)

This analysis shows the percentage of gender distribution that strongly aligns with the study concentrating on parental involvement's role in children's educational attainment. Among the 55 respondents, 36.36% were specified as female, while 45.45% were recognised as male. On the other hand, 18.18% of participants opted not to unveil their gender preference.

Age Bracket

2. What is your age bracket?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-40 Years	20	36.4	36.4	36.4
	40-50 Years	15	27.3	27.3	63.6
	Above 50 Years	10	18.2	18.2	81.8
	Below 30 Years	10	18.2	18.2	100.0
	Total	55	100.0	100.0	

Table 2: Frequency of participants as per the age bracket (Source: SPSS)

The above figure has articulated the "demographic analysis" by the age range. The data reveals a well-distributed degree of respondents across different age groups such as 20 aged 30 to 40, 15 aged 40 to 50, 10 aged above 50 years and also below 30 years. This wide representation permits the researcher to examine how different generations of parents interact with the educational performance of children.

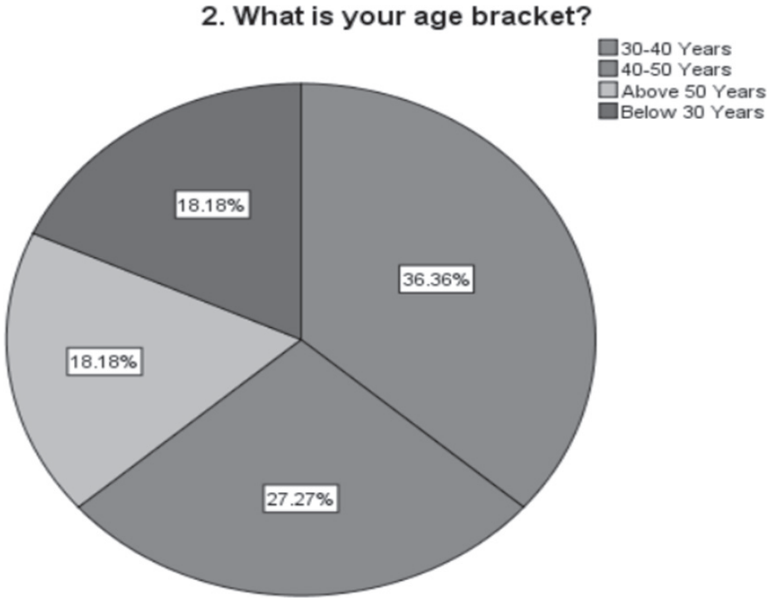

Figure 7: Percentage of participants by age range (Source: SPSS)

The above figure has stated the "demographic analysis" by the age range. The data reveals a well-distributed degree of respondents across different age groups, such as 36.36% aged 30 to 40, 27.27% aged 40 to 50, and 18.18% aged above 50 and below 30 years. This broad representation permits the researcher to examine how different generations of parents interact with children's educational performance.

Children Number

3. How many children do you have presently enlisted in school?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.	20	36.4	36.4	36.4
	2.	20	36.4	36.4	72.7
	More	5	9.1	9.1	81.8
	None	10	18.2	18.2	100.0
	Total	55	100.0	100.0	

Table 3: Children Number of the Participants Source: SPSS)

The above figure displays the number of children of the participants who are presently enlisted in schools. As per the figure, 20 participants have 1 or 2 kids who are going to school now. 5 participants informed that they have more than 2 children who are enrolled in schools. However, 10 respondents stated that they have no kids to attend school.

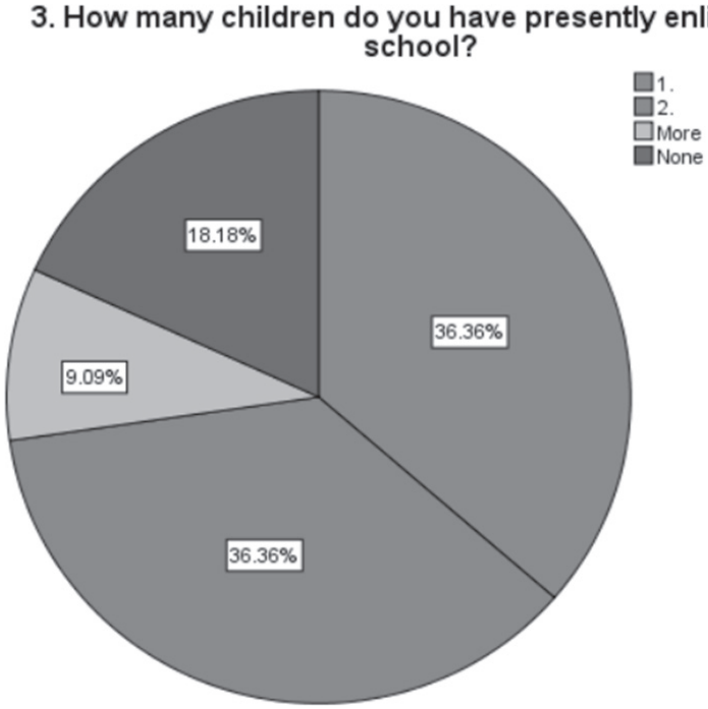

Figure 8: Children Number of the Participants (Source: SPSS)

The above figure displays the number of children of the participants who are presently enlisted in schools. As per the figure, 36.36% of participants have 1 or 2 kids attending school now. 18.18% of participants said more than two children are enrolled in schools. However, 9.09% of respondents stated that they have no kids to attend school.

Statistical Analysis

Validity Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	297.608
	df	1
	Sig.	.000

Table 4: Validity Analysis (Source: SPSS)

The above table has articulated the "validity analysis" of the different variables of the given dataset. In this analysis, the "KMO value" stands at 0.500, and normally values above 0.5 are felt acceptable, indicating that the data is appropriate for factor analysis. While a "KMO value" of 0.500 falls just at the point of adequacy, it indicates that the data may have some impediments in states of appropriateness for factor analysis.

Reliability Analysis

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.992	.992	5

Table 5: Reliability analysis (Source: SPSS)

The above table states the "Cronbach's alpha" of the "reliability statistics" of different dataset variables. As per the view of *Al-Ababneh (2020),* alpha is a broadly employed measurement of internal consistency, and it quantifies the dependability of the items contained in the study instrument. An alpha value of 0.992, as fetched from the analysis, is quite remarkable. In the context of the topic, this high alpha value highlights the robustness of the study instrument.

Descriptive Analysis

Descriptive Statistics

	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
DV_Academic Achievement of the Child	55	1	5	3.73	.165	1.224	-1.024	.322	.163	.634
IV1_Parental Involvement	55	1	5	3.73	.165	1.224	-1.024	.322	.163	.634
IV2_Home Learning Environment	55	1	5	3.82	.172	1.278	-1.027	.322	.018	.634
IV3_Socioeconomic Status	55	1	5	3.82	.172	1.278	-1.027	.322	.018	.634
IV4_Parent-Child Communication	55	1	5	3.64	.167	1.238	-.781	.322	-.253	.634
Valid N (listwise)	55									

Table 6: Descriptive analysis (Source: SPSS)

The above table states the "descriptive statistics" of different variables of a given dataset. The "descriptive statistics" equipped for the DV which is academic achievement has played a paramount role in delivering a transparent and brief overview of this key metric, enhancing the knowledge of the topic. The "mean value" of 3.73 displays the "central tendency" of the data, indicating that, on average, parental involvement has a positive influence on students' academic achievement. On the other hand, the SD of 1.224 estimates the dispersion of the data points around the mean. A higher SD indicates more significant variability in the data, while a lower SD signifies that data points are pressed closely around the mean.

Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	1.000[a]	1.000	1.000	.000	1.000	3.903E+16	2	52	.000	1.810

a. Predictors: (Constant), IV4_Parent-Child Communication, IV3_Socioeconomic Status

b. Dependent Variable: DV_Academic Achievement of the Child

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.909	2	40.455	.	.[b]
	Residual	.000	52	.000		
	Total	80.909	54			

a. Dependent Variable: DV_Academic Achievement of the Child

b. Predictors: (Constant), IV4_Parent-Child Communication, IV3_Socioeconomic Status

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.442E-015	.000		.000	1.000	.000	.000
	IV3_Socioeconomic Status	.500	.000	.522	63066905.40	.000	.500	.500
	IV4_Parent-Child Communication	.500	.000	.506	61085249.26	.000	.500	.500

a. Dependent Variable: DV_Academic Achievement of the Child

Table 7: Multiple Regression (Source: SPSS)

The above figure has articulated the "multiple regression" analysis of the variables of the given dataset. The "R-value", which is 1.000 in this current analysis, exhibits the resilience and direction of the linear correlation between the IVs collectively and the DV. The "R2 value", 1.000, informs that about 100% of the conflict in the child's academic achievement can be described by the assortment of the IVs.

Hypotheses Testing

Correlations

		DV_Academic Achievement of the Child	IV1_Parental Involvement	IV2_Home Learning Environment	IV3_Socioeconomic Status	IV4_Parent-Child Communication
DV_Academic Achievement of the Child	Pearson Correlation	1	1.000**	.974**	.974**	.972**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	55	55	55	55	55
IV1_Parental Involvement	Pearson Correlation	1.000**	1	.974**	.974**	.972**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	55	55	55	55	55
IV2_Home Learning Environment	Pearson Correlation	.974**	.974**	1	1.000**	.894**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	55	55	55	55	55
IV3_Socioeconomic Status	Pearson Correlation	.974**	.974**	1.000**	1	.894**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	55	55	55	55	55
IV4_Parent-Child Communication	Pearson Correlation	.972**	.972**	.894**	.894**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	55	55	55	55	55

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8: Correlation analysis (Source: SPSS)

The above figure describes the "correlation analysis" of diverse variables of the given dataset. A "p-value" of 0.000 indicates that the variables which are studied in this correlation study are strongly correlated.

- Hence, the alternative hypothesis for hypothesis 1, which is "raised parental involvement positively influences higher academic attainment in children" has been accepted.
- For hypothesis 2, which is "a facilitative home learning environment positively correlates with the academic attainment of children", the alternative hypothesis has been accepted.
- For hypothesis 3, which is "higher socioeconomic status is correlated with enhanced academic attainment in children", the alternative hypothesis has been accepted.
- For Hypothesis 4, which is "effective parent-child communication significantly affects the academic attainment of children", the alternative hypothesis has been accepted.

Discussion

The influence of parental involvement on children's academic achievement is significant and far-reaching. As per the conception of *Fowler, Coleman, and Bogdan (2019),* it builds a nurturing home atmosphere, promotes efficacious communication, and bridges gaps in academic distinctions. Finally, active parental

involvement provides children with the instruments and sustenance they require to excel academically, encouraging a more optimistic future for the next generation. Acknowledging parents' integral role in education is fundamental for shaping a more unbiased and successful academic landscape for all children. On the other hand, as Madani (2019) commented, the impact of the home learning environment on children's academic performance is deep. It contains the physical resources available and the perspectives, interchanges, and anticipations within the home.

Acknowledging the consequences of this environment and fostering processes that authorise parents to develop a supportive and stimulating learning space is essential for boosting academic success among children. According to *Thomas et al. (2020),* a healthy home learning environment eventually contributes to the growth of well-rounded, motivated, and academically achieved individuals who are well-prepared for future educational and career ambitions. Di Pietro et al. (2020) state that the correlation between socioeconomic status and children's academic achievement is a sophisticated and noteworthy feature of education. SES can impact access to resources, the quality of the home environment, enrichment possibilities, as well as parental involvement. While it can build disparities, it is crucial to identify that many factors contribute to a child's academic success. By managing SES-related disparities via effective policies and interventions, societies can ensure that all children, regardless of their socioeconomic background, have equal possibilities to attain their full academic possibilities.

Conclusion

In conclusion, parental participation in school plays a crucial role and significantly impacts kids' academic success. According to a thorough study, providing active parental attention helps children learn in a supportive atmosphere, achieve better academic results, and develop long-term connections. A child's educational journey should also consider their socioeconomic situation, home learning environment quality, and ability to communicate effectively with their parents. Education policies and initiatives must provide inclusive and supportive settings that enable parents to become active partners in their children's education to guarantee fair opportunities for all children.

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APPENDIX: SURVEY QUESTIONNAIRE

(Survey Link:https://docs.google.com/forms/d/1OlmFLOCajNqWMEqDzKuMhfYv0oCb2YJQiQXIC99JF8/edit)

1. What is your gender?
2. What is your age bracket?
3. How many children do you have presently enlisted in school?
4. Academic achievement acts as the greatest dimension of a child's educational success
5. The extent of parental involvement greatly affects the educational progress of a child
6. The quality of the home environment can influence a child's perspective towards learning
7. Socioeconomic status can design the level of parental involvement in the education of a child
8. Open parent-child communication has played a critical role in apprehending a child's educational requirements
9. Academic achievement reflects the incremental effect of parental involvement on a student's performance
10. Active parental engagement cultivates a sense of commitment and inspiration in students.
11. A refreshing home learning environment fosters the academic development of a child.
12. Disparities in resources and possibilities correlated with socioeconomic status can influence academic results.
13. Regular dialogue between parents and children can reduce academic support and goal setting.

Employing Collaborative Strategies to Improve Action Research Engagement of Teachers and School Heads

Gerum O. Salatan

Abstract

This study was conducted to improve the low engagement of teachers and school heads in the conduct of action research. Research engagement here was referred to as the number of research studies completed and approved. The low engagement of the participants in doing action research was attributed to the different challenges and difficulties they experienced. Among the challenges are lack of time, work overload, and writing anxiety. They also agreed to have had difficulty in identifying problems to be investigated, gathering, and analyzing data, searching for related information and literature, and writing and organizing findings. The study employed a combination of qualitative and quantitative descriptive research. The findings of this study revealed that the strategies employed in the implementation of Project SHARE or Strengthening and Honing Ability in Research Among Educators motivated the participants to conduct and complete their research. The initiative likewise improved their skills in data collection and analysis alongside the improvement of their writing skills and time management in the completion of their research. It was also found that participants occupying the lowest position (Teacher I) are the ones who are more engaged in the conduct of action research.

Keywords: Action Research, Challenges and Difficulties, Simplified Guide, Online Consultation, Research Engagement, Collaborative Research Workshop

Introduction

Conducting educational research is one of the ways that lead to making improvements and innovations in education. In fact, the Philippine Department of Education (DepEd) is committed to ensuring the delivery of quality education and achieving a culture of excellence for all learners through the conduct of research-driven educational innovations and studies geared at minimizing the instructional difficulties of the learners. The DepEd Order No. 16, series of 2017 establishes the Research Management Guidelines of the Department, which provides guidance in managing research initiatives from the grassroots to the national level, thereby promoting and strengthening the culture of research in basic education.

While several pieces of literature and studies suggest ways to write research, many teachers, on the contrary, view research work as burdensome and an additional workload apart from their regular task which is to teach. Writing anxiety, lack of time and inadequate knowledge are among the issues and challenges faced by the teachers in the conduct of research (Bullo, et al., 2021).

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For the past two years, since the creation of Claveria Central District, engagement in educational research among educators has been low. It was observed that teachers including school heads were hesitant to do action research despite their participation in various research workshops conducted. Out of 150 teaching and non-teaching personnel of the district, there were only 16 action research studies conducted from 2020-2022.

With the constantly changing landscape of teaching and learning which has brought tremendous challenges in enabling learning recovery and continuity, research-driven innovations in education are considered vital. This is where teachers and administrators design, adopt, and implement strategies through research to improve learning and educational outcomes. However, the low engagement of doing action research among the teachers and school heads in the district is a challenge that needs to be addressed.

This action research therefore aimed to address the low engagement or participation of teachers and school heads in educational research. This likewise aimed to determine the impact of the initiative, which employed various innovative approaches including the use of a simplified manual in making action research, and collaborative and consultative engagements. Moreover, it also sought to increase the total number of teachers and school heads in the district, who would engage in making classroom-based, and educational action research, respectively.

The findings of this study would benefit the learners, being the recipient of the various research-driven innovations that would be created and designed by the teachers.

It would likewise benefit the teachers, who may immerse themselves in the culture of research as a way of life in improving teaching practices to improve learning outcomes. In fact, alongside improving teachers' teaching practices, Norasmah and Chia (2016) suggested that action research should be a mandatory component of teachers' official functions and should be part of their performance evaluations to motivate them to work towards implementing action research.

Educational leaders on the other hand would also benefit if the result would lead to the creation or enhancement of policies. Education leaders and administrators at various levels play significant roles in providing policy support, and professional and technical assistance for their teachers. In fact, as instructional and curriculum specialists, school heads should encourage colleagues to analyze and use data more effectively, learn new things, or change the status quo (Harrison and Kellion, 2007), a matter affirmed and supported by Lunenburg (2010) pointing out that realization or the success of the performance of a teacher is largely a function of effective leadership support. Hence, instructional leadership support from school heads matters in teachers' engagement in research.

Proposed Innovation, Intervention, or Strategy

The intervention is named Project SHARE, which is an acronym for Strengthening and Honing Ability in Research among Educators through employment of enabling strategies which include collaborative research workshops, utilization of simplified manual in making action research, and open online consultation with the district research committee.

Project SHARE was implemented as an action research course (through the school Learning Action Cell), which discussed different parts of the action research stipulated in DO 16, s. 2017. Each part of the action research was introduced to the participants in the most practical way, which was followed by a workshop, in which the participants had to write their own.

Figure 1. Project SHARE Model

A simplified guide was given to the participants, where each part of the action research was introduced through practical questions that served as a guide for the participants in accomplishing each part. This was made to respond to the writing anxiety of the participants and their difficulty in starting to write. Not all individuals are gifted with prowess in playing with words, and in forming prose. There are those who need extensive guidance to fuel their interest to eventually engage in writing.

An open-online consultation dubbed "Research OK!" or Research Online Kumustahan was one of the approaches in implementing Project SHARE. This was a one-hour consultation per week, which catered to questions and clarifications while the participants were doing their action research.

All these approaches were geared towards improving research engagement among teachers and school heads in the district and at the same time developing among them the appreciation of classroom-based and education research as a tool in improving learners' learning outcomes.

Research Questions

This action research sought to answer the following questions.

1. What are the challenges and difficulties faced by the teachers and school heads in doing action research?
2. What is the impact of Project SHARE or Strengthening and Honing Ability in Research among Educators to the teachers and school heads in Claveria Central District?
3. Is there an increment in the number of teachers and school heads who have completed their research after the intervention?

Action Research Methods

This section presents the data-gathering methods that were employed in conducting the study. It likewise presents the participants and other sources of information as well as the data analysis plan.

a. Participants and Other Sources of Data and Information

The participants of this study were determined through the responses from the invitation sent via Google form. Only those who responded and agreed to participate were included as participants or respondents of this research.

Out of the 135 teachers, only 76, or 56.29% accepted the invitation sent via Google form together with all the eight (8) school heads, who also responded positively.

The following tables present the profile of the participants according to sex, teaching assignment (elementary or secondary), research engagement (whether has approved research or none), and length of service.

Table 1a Profile of Participants According to Sex

Types	Male	Female	TOTAL
Teachers	16	60	76
School Heads	5	3	8
TOTAL	21	63	84

The above table further shows that 75% of participants in this study were female. The great number of female participants implies that most of the teaching personnel in the district are women. The data above further implies that the country has a larger number of women teachers than men as supported by the World Bank collection of development indicators in 2020 where 87% of the teachers are women. Accordingly, census findings affirmed that in the Philippines, teaching is a woman-dominated profession (Regalado, 2017). However, while teaching is predominant in women, Quismundo (2012) as cited by Regalado (2017), disclosed that the highest occupational ranks and the highest-paying positions are still occupied by male administrators, which is true in this study where there are five (5) males out of eight (8) school administrators in the district.

Table 1b Distribution of Participants According to their Assignment

Types	Elementary		Junior HS		Senior HS	
	F	%	F	%	F	%
Teacher I	22	26.19	14	16.67	2	2.38
Teacher II	9	10.71	4	4.76	0	0.00
Teacher III	18	21.43	3	3.57	0	0.00
Master Teacher I	3	3.57	0	0.00	0	0.00
Master Teacher II	2	2.38	0	0.00	0	0.00
Head Teacher I	1	1.19	0	0.00	0	0.00
Head Teacher II	0	0.00	0	0.00	0	0.00
Head Teacher III	1	1.19	0	0.00	0	0.00
Principal I	2	2.38	1	1.19	0	0.00
Principal II	2	2.38	0	0.00	0	0.00
TOTAL	***60***	***71.43***	***22***	***26.19***	***2***	***2.38***
N	84					

According to the level of assignments, 71% of the participants were elementary school teachers and school heads wherein 26% were holding a Teacher I position. Teachers occupying Teacher III items ranked second in the number of participants. The table also shows that senior and junior high school teachers had less participation in this study. Looking at the table, it can be deduced that most of the teachers in the district are those occupying Teacher 1 plantilla positions.

Table 1c Distribution of Participants According to Research Engagement From 2020-2022

Types	Elementary		Junior HS		Senior HS	
	F	%	F	%	F	%
Teacher I	6	7.14	1	16.67	1	1.19
Teacher II	1	1.19	1	1.19	0	0.00
Teacher III	1	1.19	1	1.19	0	0.00
Master Teacher I	1	1.19	0	0.00	0	0.00
Master Teacher II	1	1.19	0	0.00	0	0.00
Head Teacher I	0	0.00	0	0.00	0	0.00
Head Teacher II	0	0.00	0	0.00	0	0.00
Head Teacher III	1	1.19	0	0.00	0	0.00
Principal I	0	0.00	0	0.00	0	0.00
Principal II	1	1.19	0	0	0	0.00
TOTAL	***12***	14.29	***3***	***3.57***	***1***	***1.19***
N	84					

In this table, research engagement refers to whether the participants had conducted action research from 2020 to 2022. It reveals that only 19.05% of participants had conducted action research in the past two years. Out of those who had approved research studies, 12 personnel, or 14.29% were from elementary. Looking at the table, it can be presumed that the district has low engagement in educational research despite yearly training and re-orientations conducted. It can also be gleaned from the table that teachers occupying the Teacher 1 position had the most engagement in research. In an interview, these teachers said that doing action research would help in their aims for promotion, a point which was also emphasized by Juliano (2019) elaborating that one of the reasons that prompted these teachers to do research is the equivalent points that will be given during the ranking of teachers for promotion. However, with the number of engagements across all teaching positions reflected in the table above, low or no engagement in research was common to all.

Table 1d	Distribution of Participants According to Length of Service							
Types	Elementary		Junior HS		Senior HS		Total	
	F	%	F	%	F	%	F	%
0-5 years	11	13.10	12	16.67	0	0.00	23	27.38
6-10 years	20	23.81	6	7.14	2	2.38	28	33.33
11-20 years	12	14.29	2	2.38	0	0.00	14	16.67
21-30 years	8	9.52	2	2.38	0	0.00	10	11.90
31-35 years	6	7.14	0	0.00	0	0.00	6	7.14
36 years and above	3	3.57	0	0.00	0	0.00	3	3.57
TOTAL	***60***	71.43	***22***	***26.19***	***2***	***2.38***	84	100.00

Most of the participants, as shown in the table above, belong to younger generations of teachers as to length of service. Sixty-one percent (61%) were those below 10 years in the service. Given the above, it can be assumed that the district has a larger number of new teachers.

b. Data Gathering Methods

The researcher sought permission to conduct this study from the Office of the Schools Division Superintendent. Proper protocols were followed prior to the conduct of the research.

The study strictly observed the ethics of research as indicated in the Research Management Guidelines of the Department of Education (DepEd Order No.16, s.2017) Permission and consent from the respondents were sought.

This study employed both descriptive-qualitative and descriptive-quantitative research designs. It also used Focus Group Discussions (FGD) to identify the challenges and difficulties encountered by the teachers and school heads in conducting action research, as well as the impact of the intervention on the teachers and school heads as far as research engagement is concerned.

The primary data gathered during the FGD underwent thematic analysis and were transcribed into statements or themes (qualitative). An instrument was developed thereafter to have a quantitative analysis of the data gathered. Descriptive statistics was used employing frequency, percentage and mean alongside a five-point Likert Scale to measure the degree or level of challenges and difficulties, as well as the level of effectiveness of the intervention.

Scoring Procedures:

The following items are scoring tables consisting of the scale, the range of weighted mean, and the visual interpretation of the responses of the participants.

Rating Scale	Weighted Mean Range	Visual Interpretation		
		Challenges	Difficulties	Impact of Project SHARE
5	4.50 – 5.00	strongly agree	Very Difficult	Very Effective
4	3.50 – 4.49	agree	Difficult	Effective
3	2.50 – 3.49	Undecided	Neutral	Neutral
2	1.50 – 2.49	disagree	Easy	Less Effective
1	1.00 – 1.49	strongly disagree	Very Easy	Ineffective

For problem number 3, the numbers of research completed before and after the intervention were compared.

Results and Discussion

Challenges of Teachers and School Heads in the Conduct of Action Research

The findings of the study revealed notable challenges faced by the teachers and school heads in conducting research. These include (1) lack of time, (2) additional task or workload, (3) writing anxiety. It was found that the majority of the participants strongly agree that lack of time challenges them in doing research. While teachers are qualified to do research, factors like time and other resources are to be considered (Usita, 2022). In fact, in a related study, it has been discussed that low to non-engagement in research can be attributed to lack of time. Teachers, particularly in elementary schools spend the entire day in class and are mostly mothers who attend to their family needs at home, hence adding research activities would mean additional time, which makes the teacher go beyond the prescribed hours to finish a day's workload (Juliano, 2019).

Table 2a Perceived Challenges Encountered by Teachers and School Heads in the Conduct of Research

	MEAN	Interpretation
1. I lack time to do research.	4.571	Strongly Agree
2. It is an additional task or workload, and it is burdensome to me as a teacher.	4.560	Strongly Agree
3. I have writing anxiety. I don't know how to express my ideas in writing.	3.524	Agree
4. There is a lack of support from the school.	2.226	disagree
5. There is a lack of learning resources in research.	3.071	undecided
6. My knowledge of action is inadequate.	3.250	undecided

On the other hand, the participants agree that research activities mean additional workload or tasks, which would be burdensome to them. While teachers and school heads stay at school for 6-8 hours a day, Usita, (2022) narrated that the work pressure causes a struggle for these employees to engage in additional research tasks. In addition to the lack of time and the burdensome nature of doing research, the participants also agree that the skill or ability to write or express ideas in words following correct grammar and other technicalities in writing challenged them. Accordingly, this decreases their interest in completing a research study. This

finding affirmed the results of the previous study that teachers have fear when writing especially in dealing with grammar and analyzing data (Tindowen, 2019).

Difficulties Faced by Teachers and School Heads in the Conduct of Research

The table presents the difficulties encountered by the teachers and school heads in the conduct of action research. It can be seen in the table that difficulty in data analysis has the highest mean which connotes that the teachers and school heads of Claveria Central District had difficulty in analyzing data.

Meanwhile, the results also show that the majority of the respondents are experiencing complexities in the conduct of action research in terms of finding relevant literature and information. Accordingly, a literature review is considered a critical part of research. Pieces of relevant literature provide theoretical backgrounds of the study, which enables the researcher to establish a connection between the present study and those that have already been studied or investigated (Tindowen, 2019; Ross & Bruce, 2012).

Difficulty in writing and organizing findings ranked third in the difficulties encountered by the respondents in the conduct of action research. This may be attributed to the writing anxiety of teachers as mentioned in the challenges above, where a majority of them agreed that the technicalities in writing reduce their interest in completing their action research.

It can also be gleaned from the table that the difficulty in identifying the problem or issues to be solved and the difficulty in gathering and collecting data obtained the same mean. This implies that the majority of the teachers and school heads believe that searching for problems and issues to be studied and gathering and collecting data are difficult. This may be attributed to the lack of time and pressure of having research as an addition to their regular tasks, implying further that the lack of time and work overload are contributing factors to the difficulty they experience in the conduct of research.

Table 2b Perceived Difficulties Encountered by Teachers and School Heads in the Conduct of Action Research

	MEAN	Interpretation
1. Difficulty in identifying issues or problems to be solved	3.917	Difficult
2. Difficulty in finding relevant information or literature	4.083	Difficult
3. Difficulty in developing the process and gathering or collecting data	3.917	Difficult
4. Difficulty in data analysis	4.548	Very Difficult
5. Difficulty in writing and organizing findings	3.929	Difficult

The Impact of the Intervention

The results of the study revealed that Project SHARE is effective as an intervention in improving the research engagement of teachers and school heads. Table 3 presents the mean level of impact as perceived by the respondents of the study. It can be seen gleaned that the majority believed that Project SHARE was very effective insofar as motivating the participants to conduct complete their action research. Meanwhile, they also agree that the initiative helped them overcome their fear of writing research and at the same time improved their knowledge of data collection and analysis. Some of their verbalizations are as follows:

R12: "Working with colleagues collaboratively through the Learning Action Cell (LAC) was helpful. I was able to write easily because I was able to benchmark the ideas from my groupmates. The LAC as Project SHARE strategy is helpful."

R36: "For a person with less confidence in writing, the simplified manual guided me on how to start my sentence in every chapter of my research."

R81: "The simplified guide helped me understand how data is handled and analyzed even using simple statistics."

R71: "I realized that statistics like frequency, percentage, and mean can be sufficient to analyze research data. Thank you for the simplified guide."

Further, the Online Kumustahan or (Online Consultation) strategy of Project SHARE, helped the participants to manage their time which enabled them to finish their action research in the given period. This implies that when teachers or school heads are assisted and given timely feedback, they can easily manage the timeline for completing their studies. Some of their verbalizations are as follows:

R15: "The mechanism is perfect. Technical assistance is made available without meeting in person. It made me maximize my time."

R64: "I am glad that giving feedback is clear and timely. Online consultation is a big help for us in distant barangay. Instead of meeting onsite, our outputs could be checked online."

R28: "It provides a support system, which makes it easier for me because I was able to scout ideas during the *kumustahan* (consultation)."

Table 3 **Mean Level of Impact of Project SHARE**

	MEAN	Interpretation
1. Project SHARE motivated me to conduct and complete my action research.	4.821	Very Effective
2. It helped me overcome my fear of writing research.	4.619	Very Effective
3. I gained relevant improvement in collecting and analyzing data.	4.536	Very Effective
4. I was able to manage my time and complete my action research in the given period.	4.357	Effective
5. I gained improvement in my writing skills.	3.976	Effective
Total Mean	***4.462***	***Effective***

Number of Completed Research after the Intervention

From the 16 completed action research, after the six-month implementation of Project SHARE, a total of 49 action research studies were completed while 15 are still ongoing.

The table below shows the comparative data of completed research before and after the intervention. With the implementation of Project SHARE, research engagement of teachers and school heads in terms of action research completion significantly increased to 39.29%

The 15 other ongoing research is due to the time frame of studies which require more than six months. In sum, a total of 64 action research studies have been conducted, which constitutes 76% of the total respondents.

Conclusion

Project SHARE as an intervention helped improve the research engagement of teachers and school heads in Claveria Central District amid the challenges and difficulties they encountered in the conduct of research. The strategies employed such as the collaborative research workshops through the Learning Action Cell, utilization of a simplified guide in writing action research, and the online "kumustahan" or consultation were responsive to the needs of the participants. They agreed that the intervention motivated them to conduct and pursue action research, improved their confidence in writing the same alongside improving data gathering and analyzing skills, and completed action research following the timeline.

On the other hand, this study also concludes that teachers occupying the lowest position are the ones who are more engaged in research, a finding that supports the previous study explaining further why teachers with the lowest position, or Teacher I in this instance, strive to conduct action research. Accordingly, to do research is to have a great chance of promotion since an approved, and completed research is given weight in the selection process for promotion (Juliano & Zabala Jr., 2019).

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A Descriptive Study on the Challenges and Interventions of Traditional vs. Online Learning during the Covid-19 Pandemic

Arnel G. Perez, Gracia T. Canlas and Glen S. Nolasco

Abstract

Classroom was the keystone of the formal education system and the success of the learning-teaching activity relied on efficient classroom management. As COVID-19 affects the educational system in the Philippines, a paradigm-shifting approach from traditional to online learning modalities started to normalize. With this, several problems were now inevitable in the different online learning strategies for both students and faculty. Therefore, the goal of this study is to assess the challenges and interventions of traditional and online learning modalities amidst the COVID-19 pandemic. This study used a phenomenological research design and purposive sampling method to obtain qualitative data from the respondents. A total of 8 respondents out of 30 full-time faculty of the IASTE were subjects of this study. The finding affirmed that the challenges encountered by the faculty during pre-pandemic were expression of courtesy, tardiness, horseplaying, classroom management, and truancy. Interventions used to alleviate the challenges were verbal reprimand, escalation of the concerns to the authorities, attendance tracking, and recapitulation. During the pandemic period, challenges recorded in this study were coping mechanisms, internet connectivity, power interruption, and low specificity of E-device. The interventions that the faculty utilized to address the problems were providing workshops/training and webinars, reproduction of modules, and installation of DigiHubs. The results of this study could contribute not limited to the creation of an online classroom policy but also to enhance the learning competencies and knowledge acquisition of the student

Keywords: COVID-19, DigiHubs, IASTE, Pandemic, Pre-pandemic

Introduction

In a conventional classroom, teachers play various roles in the learning of the students, and classroom management. A mismanaged classroom due to ineffective teaching leads to students and teachers suffering in a disorderly and disrespectful class with no rules and procedures to guide students` behavior (Marzano, 2003 p.1). Classroom management may be defined as "the act of supervising relationships, behaviors, and instructional settings and lessons for communities of learners" (Iverson, 2003, p. 4). Iverson explains that classroom management is a preventive activity that results in decreased discipline problems (2003, p.4). Taking the preventive nature of classroom management a step further, Arends asserts that "preventive management is the perspective that many classroom problems can be solved through good planning, interesting and relevant lessons, and effective teaching" (2007, p. 173). This paper shall examine the special challenges faced in the

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implementation of classroom management in the college online environment. Particular emphasis shall be given to the unique challenges faced by the online college faculty concerning student learning and knowledge acquisition.

Classroom management is the process by which teachers encourage and maintain appropriate behavior of students in classroom settings (Kratochwill, DeRoos, & Blair, 2018). Effective classroom management strategies are implemented to enhance the pro-social behavior of students and increase academic engagement across all subject areas and grade levels (Emmer & Sabornie, 2015; Everston & Weinstein, 2006; Marzano, 2003). According to Brophy (2006), well-run classroom management systems create a learning environment that enhances both the academic skills and social-emotional development of students, ultimately increasing student success in school.

The recent pandemic, Coronavirus affected the teaching-learning process by separating time and distance of the student-teacher interaction. Acknowledging the situation, in the 3rd week of March, several Institutions decided on a study-from-home policy. This policy means to stop the transmission of COVID by closing schools to promote physical distancing and secure the health of the faculty and students. By the middle of March, all schools in the Philippines started to follow the study-from-home policy mandated by the CHEd - DOH. This policy drastically changed the educational system in the Philippines from traditional to remote learning.

In addition, remote learning, gives new perceptions in managing classes, especially in primary schools. Some research regarding education in COVID time is as follows. The education is managed using an online platform i.e. Google Meet platform fully implemented in a large number of schools in Georgia (Butcher, 2020). Xie & Yang (2020), mentioned that teachers in secondary elementary schools that apply distance learning must provide some instruction before the lesson, upload the materials related to the lesson, upload a micro-video used for the explanation, and give a small amount of tasks. Furthermore, Gupta (2021) explains the different impacts of the pandemic on classroom teaching with respective solutions. The researcher elaborated that time management in online classes was more complicated than face-to-face. He also stipulated that discussion in online platforms requires various solutions such as utilizing Zoom, and online classroom software such as Udemy, RCampus, and Learnopia. Also, other focal points of his paper were the technical issues during the Pandemic were inevitable. These include interruption of internet connection, compatibility of classroom software, and technological proficiency were worth mentioning. These postulations of Gupta, supported the theory of Edmund O`Sullivan *et al.,* known as transformative learning theory (Mezirow, 2018). This theory explores the ideas of the learners which could adjust based on the new information acquired in the Pandemic (Mezirow, 2003). Bao (2020), proposed five impact principles for online education in higher education. The five principles are (1) having relevance in designing both online and student learning; (2) effectively informing the instruction; (3) providing satisfactory support to students; (4) best participating in class; and (5) Preparing errors that come from the platforms.

Nonetheless, in the Philippines, scarcity of research related to best practices, challenges, and intervention during the Pandemic was lacking. Hence, this study focuses on exploring the challenges and interventions used by the faculty of the Institute of Arts, Sciences, and Teacher Education, Mabalacat City College.

Research Objectives

Generally, this paper aims to assess the challenges and interventions of the Faculty of Institute of Arts, Sciences, and Teacher Education (IASTE), Mabalacat City College on the traditional and online learning during the Covid-19 pandemic.

Methods

Research Design

This study employs a phenomenological research design to assess the challenges and interventions of the IASTE Faculty of Mabalcat City College. A narrative approach was utilized to fully understand the actual experiences of the respondents in their respective online classes. Similarly, this approach was employed to describe and understand the human subjective experience of college instructors as the central focus of the study (Garvis, 2015). All the responses in this study were coded and described following the steps in thematic analysis (Moules et al., 2017).

Respondents

The respondents in this study were full-time college instructors of the Institute of Arts, Sciences, and Teacher Education (IASTE) at the Mabalacat City College. The convenience sampling method was utilized in this study to maximize the available respondents in the IASTE. Since some instructors did not have an internet connection and health protocol prohibits face-to-face interviews or printed survey questionnaires, this sampling method provides the safest approach. Also, the researchers considered the availability of the instructors, and willingness of the respondents to be part of this research. There were eight (26.67%) out of 30 full-time faculty of IASTE voluntarily participated in the study. The primary concern of the study was to assess the challenges and interventions of the faculty. Hence, variables such as age, gender, ethnicity, economic status, religion, and other variables were not included in this study.

Data Collection

The construction of open-ended questions as well as the validation of questionnaires was executed by the Research Office of Mabalacat City College. Furthermore, the researchers wrote a letter to the Head of the Academic Department, requesting permission to perform the research at Mabalacat City College. After all the questions were confirmed and validated, the researchers distributed the survey form to the instructors of Mabalacat City College via Google Forms. The Researchers asked permission to get the list of the Facebook accounts of the participants to make the data collection robust.

Ethical Consideration

The obtained data in this research were encapsulated by the RA 10183 - Data Privacy Act of 2012, and the survey questionnaire used in this study was evaluated and validated by Mabalacat City College's research office. In the actual conduction of the research, the researchers adhered to ethical standards. Informed consent was adequately communicated to the concerned respondents involved. Therefore, the researchers respect the right of the critical informant to withdraw during the study process. Furthermore, the names of the participant were kept anonymous, and their responses were treated with the utmost confidentiality. Lastly,

the researchers observed complete objectivity in interpreting the data to surface the unknown information relative to the contemporary work. (Arifin, 2018; Cacciattolo, 2015; Horstkötter and Wert, 2020; Green, 2019). Responses obtained from the respondents were converted into PDF files with a generated password before deletion.

Results and Discussion

Challenges and Intervention during the Pre-Pandemic

In March 2020, the COVID-19 pandemic was declared by the World Health Organization to enforce safety for the public (Almazova et al., 2020; Balakrishnan, 2020; Bozkurt et al., 2020; Ghazi-Saidi et al., 2020; Goncalves, 2020; Habaragoda, 2020; Karademir et al., 2020; Mukherjee & Hasan, 2020; & Refaat El Said, 2020). Nonetheless, the new mode of instruction (online discussion) encountered many issues including how the students and teachers cope with the new approach (Almazova et al., 2020; Habaragoda, 2020), availability of electronic gadgets used in online/remote learning (Almazova et al., 2020; Bozkurt et al., 2020; & Habaragoda, 2020), the problem about the internet connectivity, and being at the remote area (Habaragoda, 2020; Refaat El Said, 2020). As shown in Table 1, the answers of the participants revealed the challenges and interventions encountered during the pre-pandemic. These include the expression of courtesy such as horseplaying, "po" and "opo" which are words utilized to express respect in the Philippines and were not properly used during the pre-pandemic. Nevertheless, since the pandemic hit the educational system, these courtesy words were neglected most of the time. These politeness terms are pivotal in the Philippines as they are used when engaging in speech with older/administrators, and promote respect as Filipinos converse in a discussion (Agna et al., 2022; Rañosa-Madrunio, 2014). Also, tardiness was one of the challenges of the faculty during the pre-pandemic. This challenge is not new in the Philippines. According to Esperanzaabc (2015); Arbiol and Billiones (2013), tardiness and absenteeism were some of the problems of the students that could affect their learning competencies and knowledge acquisition. Relatively, this statement is similar to the challenges of the IASTE faculty members as tardiness in their classrooms increases, the learning capability of the students is affected.

To address the "expression of courtesy" and "tardiness" during the pre-pandemic, faculty members obtruded verbal reprimand with the assistance of the program head/dean of the Institution to settle the issues in a virtuous way. These interventions (Table 1) might be old-school approaches but found to be practical during the pre-pandemic. In addition, Curram et al., (2019) and Mumthas et al., (2014) provided robust statements and promising results concerning the effect of verbal reprimands and one-on-one counseling on the students subjected to misbehavior.

More challenges were also recorded in this study (Table 1) such as "Classroom management" and "Truancy/ Absenteeism". These two were the most dominant challenges in the pre-pandemic situation at Mabalacat City College. As mentioned by the faculty members of IASTE, "Some students of this Institution were working students which contributed to their absences". To concretize, Sahin et al., (2016) reported that students who have full-time jobs and are under heavy working loads could increase and affect the truancies of the students. Furthermore, exhausted students might choose to ditch school or not attend their classes. Therefore, to alleviate the situation, faculty members provide interventions to address the problems. Some focal points include "Attendance Tracking" and "Recapitulation of the previous discussions". These two were some of

the generic methods used in the classroom to manage their learning competency and knowledge acquisition (Deugo, 2013). Also, recapitulating the previous discussion provides a positive impact on the students as they continue to the next topic (Oyzon and Olmos, 2009).

Table 1 Summary of Challenges and Interventions

Period	Challenges	Interventions
Pre-pandemic	Expression of courtesy (po and opo)	Verbal reprimand but proactive and composed Escalating to the school`s program head/dean
	Tardiness	
	Horseplaying	
	Classroom Management	Attendance tracking Recapitulation
	Truancy/absenteeism	
Pandemic	Coping mechanisms of students and faculty	Online workshop and webinar about online learning
	Internet connectivity	Remedial class Reproduction of Students' Modules
	Power Interruption	
	Low specificity of electronic device	
	Household disturbances	Installation of DigiHubs

Challenges and Intervention during the Pandemic

As previously mentioned, the physical schools were closed to mitigate the spreading of the coronavirus (COVID-19). Hence, the face-to-face learning approach shifted to a distance or remote learning approach in which the readiness of the students and teachers was considered premature. Before the COVID-19 pandemic, majority of the HEIs all over the world practiced the traditional face-to-face learning approach which included the usual methods in classroom management.

As revealed in Table 1, one of the challenges of the faculty occurred post-pandemic was "Coping mechanisms of students and faculty". As mentioned by De Villa and Manalo (2020); Veerabhadrappa and Yadav (2021) as students and faculty adapt to the new normal, coping mechanisms are some of the teaching strategies they take into account. Since traditional teachers prefer face-to-face, the integration of technology into the educational system (Wahid et al., 2021) made them suffer (Fabro et al., 2023) and struggle (Phillips, 2021). To impede this challenge, Mabalacat City College, provided various webinars and workshops related to Learning Management Systems, and online classroom platforms such as Google Scholar, Zoom, and MS Teams which make educational management easier and bring order. As instructors utilized these online management systems this paved the way for the instructors and students to cope with the ongoing Pandemic (Garcia et al., 2021) and to equip the students and instructors as the educational system in the said Institution was undergoing a paradigm shift due to Covid pandemic. These results were also supported by Jena (2020), Gopal and Singh (2021), and Herguner et al., (2021) that the utilization of these innovative approaches enhances the learning materials of the students and teachers, introduces digital literacy in both students and teachers, facile time management, and open for distance or remote learning. However, there are also Farooq et al., (2020), Lelisho et al., (2023), and Magableh and Alia reiterate the negative impacts of the online

learning approach which encapsulates educational activity hampered since some students do not have access to the internet, and some students and teachers were unprepared for online education.

Some conventional problems were also reported in this study (Table 1). These include "Fluctuation/absence of the internet connectivity" and "Power interruption". Unsurprisingly, the inaccessibility of an internet connection is not new in some developing countries like Indonesia (Sparrow et al., 2020) and the Philippines (Briones, 2021). As reported by Boholano et al., (2021) and Briones (2021) internet connectivity was one of the issues that the Philippines encountered. Moreover, internet connection and low-end specs of electronic devices were some of the challenges of the Philippines as the new normal arrived in the educational system (Ancheta and Ancheta, 2020). On the other hand, power interruptions in the Philippines have sporadic experiences that affect the learning modality of the students (Arciaga, 2023). This challenge is a profound issue that is beyond the control of the Institution. Henceforth, to mitigate the situation, "Remedial online classes – if the power is up" or "Reproduction of Students` modules – could be used by the students regardless of the power interruption" were some of the interventions of the Mabalacat City College. Incorporating remedial classes during no internet connection/electricity is very useful and effective amidst of the pandemic (Santos, 2023; Sriadhi et al., 2019). In addition, several researchers supported the effectiveness of printed distance learning modalities such as modules. They provide the acquisition of better self-study (Gatus and Vargas, 2022), enhance reading drills (Munoz, 2023), and utilize other learning platforms like YouTube links specified in the modules (Irfan et al., 2023).

Lastly, Household disturbances such as noise and household chores are some of the problematic scenarios occurring in the pandemic. Interestingly, Mamolo et al., (2020); Tanucan and Uytico (2021) mentioned that the most common challenge in online class are household disturbances. Further, Ortega et al., (2022) explicitly discussed the negative effects of household disturbances on the learning capability and concentration of the students. Thus, to address this problem, the Mabalacat City College installed DigiHubs in different Places in Mabalacat City, Pampanga where the students can do their online class/tasks. These hubs contain a bandwidth of 300mbps, desktop computers, printed modules, and tablets that were used during online classes. These online learning materials cater the students in remote areas or when they do not have internet connectivity.

Implication of the Study

This study determined the challenges of the faculty under the Institute of Arts, Sciences, and Teacher Education (IASTE) of Mabalacat City College during the new normal and their interventions. The findings revealed that the challenges and interventions used in the new normal were very distinct in the pre-pandemic and pandemic scenarios. In addition, specific intervention was needed relative to the challenges of the faculty member. Hence, the research suggests the following statements to improve the online learning modalities:

1. Revisit or create institutional policy in the implementation of the online classes;
2. Get feedback from the college instructors of the institutes (IASTE, IBE, ICS, and IHTM) about their experiences in online learning specific to classroom management;
3. Benchmark the best-practiced classroom management of the other HEIs; and
4. Conduct a series of webinars related to classroom management.

Conclusion

The findings in this study affirmed how the faculty of IASTE faced the challenges during the pre-pandemic and pandemic. Collectively, the challenges in the normal include expression of courtesy, tardiness, horse playing, classroom management, and truancy. During the pandemic, coping mechanisms, internet connectivity, power interruption, low specificity of the E-device, and household disturbances were some of the prominent challenges that faculty of IASTE encountered. The researchers reported the interventions used by the faculty of IASTE during pre-pandemic were verbal reprimand, escalation of the concerns to the authorities, attendance tracking, and recapitulation of the previous topic before continuation. In brief, the interventions applied during the pandemic were the administration of online workshops/training and webinars for the faculty and students, reproduction of modules, and installation of DigiHubs for less fortunate students that provide ideal solutions to the impacts of the Covid-19 pandemic on the educational system of the Philippines. These preliminary data of pre-pandemic and pandemic challenges/interventions could provide information and an ideal solution as the educational system in the World started to embrace blended learning.

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Conflict of Interest

The authors of this article hereby declare that there is no conflict of interest whatsoever with respect to the publication of this paper

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Factors Contributing to Low Results in Ethiopian Students' National Examination: A Review

Endale G.

Abstract

The study aims to investigate the factors influencing low student performance in Ethiopia's national examination of 2015. It seeks to understand the impact of inadequate access to quality education resources, including textbooks and teaching materials, as well as socioeconomic aspects like poverty and parental education level on academic achievement. Additionally, it explores the contribution of teaching methods and pedagogical approaches used in Ethiopian schools, alongside the effect of infrastructure and technology availability on student performance. To achieve its objective, the study will utilize a desk review methodology and qualitative research methods to systematically analyze existing literature and documents relating to the research topic. In conclusion, the research aims to examine multifaceted elements impacting student outcomes and to offer actionable insights to enhance educational performance in Ethiopia. The evidence suggests systemic issues within Ethiopia's education system contributing to poor student performance. These include limited access to quality education resources, socioeconomic factors, teaching methods, and facilities. The recommendations underscore the need for a multifaceted and tailored approach to elevate students' performance in Ethiopia's national examination. Key suggestions include promoting equity, enhancing teaching methods, providing equitable infrastructure, and continuous curriculum review. Addressing inadequate access to educational resources and enhancing the capacity of school principals are also crucial. Furthermore, there is a call for further research and analysis to pinpoint specific factors contributing to low performance and to craft effective improvement strategies.

Keywords: Factors, Low Results, Students' National Examination

Introduction

Access to high-quality educational resources, such as textbooks and instructional materials, significantly influences students' academic success in Ethiopia. Scarce access negatively impacts learning outcomes and exam performance (Abdulahi, 2016; Pasek & Jones, 2015). Additionally, research demonstrates that poverty and parental education level play a pivotal role in children's academic success as children from disadvantaged socioeconomic backgrounds often encounter obstacles hindering their educational development and test performance (Nathan & Thapa, 2020; Teklu & Arefayne, 2019).

Instructors' teaching methods and pedagogical approaches significantly impact students' academic performance (Mulugeta, Manaye, & Tadesse, 2016; Samson, 2013). Insufficient infrastructure and restricted access to resources can also affect students' learning results, motivation, and engagement (Belay, 2019; Tefera, 2017). Therefore, the purpose of this study aimed to understand the unique impact of these key factors on Ethiopian students' low examination outcomes in the 2015 national test.

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Statement of the problem

In Ethiopia, national examination results are an important measure of students' educational attainment as well as a standard for assessing the efficiency of the education system (Teshome, M., & Astatke, A. 2017). However, the poor performance of Ethiopian pupils in their national test in 2015 raises questions about the underlying conditions that contributed to this outcome.

Understanding the factors affecting Ethiopian students' performance on the national test is crucial for improving their educational outcomes. Investigating these elements can help address the challenges within the educational system and ultimately enhance academic achievement for all students.

Research Question

What are the key factors that contributed to the low results of students' national examination in Ethiopia, and how do they uniquely impact academic performance in the Ethiopian context of the 2015 national test?

Research Objective

To identify and analyze the key factors that contributed to the low results of the students' national examination in Ethiopia.

Theoretical Review

The objective of this theoretical study is to investigate the several elements that have been noted in the literature as possible causes of low student performance on the national test.

In the Context of Ethiopia

The impact of inadequate access to quality education resources on students' performance in the national examination

In Ethiopia, students' academic success is greatly influenced by the accessibility and availability of high-quality educational resources, such as teaching materials and textbooks, especially when it comes to national exams.

Availability and Accessibility of Education Resources

Numerous scholarly works underscore the significance of sufficient availability of educational resources in augmenting the learning results of pupils (Tesfaye, 2018; Seid, 2016). However, due to issues including inadequate infrastructure and financial resources, access to high-quality textbooks and instructional materials is still difficult in Ethiopia (Hailu & Moreda, 2016).

Impact on Learning and Performance

Studies show that students' academic performance is significantly impacted when they do not have enough access to high-quality educational materials. According to Tesfaye (2018), pupils with less access to instructional tools and textbooks performed worse on the national test than students with adequate resources. It was shown that students' understanding, study habits, and general performance were all hampered by a lack of resources.

Influence on Teaching and Instruction

Limited access to educational materials has an influence not just on students but also on teaching and instruction. Teachers encountered difficulties in preparing courses and efficiently presenting information when there was a lack of high-quality teaching resources, according to Hailu and Moreda (2016). This, in turn, has an influence on the quality of instruction and, as a result, on students' knowledge and performance.

Socioeconomic Factors and Resource Disparity

According to research, there is a link between socioeconomic variables and access to educational resources. According to Seid (2016), students from lower socioeconomic backgrounds frequently experience more obstacles in obtaining quality textbooks and instructional materials. This difference may exacerbate the achievement gap between students' from various socioeconomic backgrounds.

The influence of socioeconomic factors on students' academic achievement in the national examination

Poverty and Academic Achievement

Numerous studies have found a link between poverty and academic success. Alemu and his colleagues (2021) discovered that students' from economically disadvantaged backgrounds have worse academic performance and test scores in Ethiopia. Poverty generates difficult circumstances that can limit access to quality educational resources, contribute to decreased school attendance, and negatively impact learning outcomes (Bedaso et al., 2019).

Parental Education Level and Academic Achievement

Another important socioeconomic aspect that has been found to significantly affect students' academic success is their parents' educational attainment. According to research, parents' level of education has a significant impact on their children's desire for learning, goals for their careers, access to resources, and level of support from their schools (Braun et al., 2016). Pupils who have better educated parents are more likely to score highly on the national test (Debele et al., 2021).

The Mediating Role of Parental Involvement

Parental engagement may operate as a bridge between socioeconomic variables and academic success in students'. Adequate parental participation, which includes parental support, advice, and encouragement, has been linked to better academic performance (Debele et al., 2021). It can operate as a mitigating factor for the harmful impacts of poverty and poor parental education levels on children' academic progress.

Cultural and Systemic Influences

Cultural and systemic elements can interact with socioeconomic considerations to impact students' academic performance. Cultural views and norms, for example, might influence parental expectations, educational ideals, and student motivation (Alambo, 2017). Systemic variables, such as unequal resource allocation and discrepancies in school quality, might exacerbate the socioeconomic success gap (Bedaso et al., 2019).

The role of teaching methods and pedagogical approaches employed by teachers in Ethiopian schools

The role of teaching methods and pedagogical approaches in students' academic achievement is a critical aspect of educational research.

Traditional Teaching Methods and Rote Learning

Traditional teaching approaches such as rote learning and teacher-centered instruction have been recognised as factors contributing to low academic attainment in Ethiopia (Getahun et al., 2019). Memorization and passive learning are frequently prioritised above critical thinking, problem solving, and deeper knowledge in these approaches.

Lack of Active Learning Strategies

According to studies, active learning practises are rarely used in Ethiopian schools. Active learning entails involving students in the learning process through interactive activities, conversations, and hands-on activities (Gebremichael & Reddy, 2020). The absence of these techniques may jeopardise students' capacity to acquire higher-order thinking abilities, which are required for success on the national test.

Insufficient Teacher Training and Professional Development

According to certain research, Ethiopian teachers' low access to professional development opportunities and inadequate training are factors in their unsuccessful educational practises (Belachew & Waritu, 2021). Insufficient training might lead educators to stick with antiquated techniques that are at odds with contemporary teaching methodologies.

Language of Instruction

Studies reveal that a linguistic divide between educators and learners might impede successful communication, understanding, and academic performance (Kinde, 2016). This language barrier may make it more difficult to apply effective teaching techniques and may have a detrimental impact on students' learning objectives.

The effect of infrastructure and facilities on students' performance in the national examination

Classroom Conditions and Academic Achievement

Studies indicate that conducive classroom conditions can positively influence students' academic achievement. Adequate lighting, ventilation, seating arrangements, and appropriate classroom size contribute to a comfortable and conducive learning environment (Wudu & Ditamo, 2019). Enhanced classroom conditions are associated with increased student engagement, focus, and consequently, improved academic performance.

Availability and Utilization of Technology

Research suggests that the availability of technology, such as computers, internet access, and audiovisual aids, allows for innovative and interactive teaching methods (Lemessa, 2018). Integration of technology in the classroom can enhance students' engagement, critical thinking, and information literacy skills, ultimately contributing to improved performance in the national examination.

Infrastructure Disparities

Disparities in infrastructure and facilities between different schools and regions can significantly affect students' academic achievement. Unequal distribution of resources leads to varying levels of access to quality infrastructure, hindering the learning experience for students in schools with inadequate facilities (Wudu & Ditamo, 2019). Such disparity can contribute to inequitable outcomes in the national examination.

Impact of Physical Infrastructure

Aside from classroom conditions, overall physical infrastructure also plays a role in students' academic achievement. The availability and quality of facilities like libraries, laboratories, and sports facilities can have a positive impact on various aspects of education, including research skills, practical knowledge, and physical well-being (Lemessa, 2018). Adequate facilities create opportunities for holistic development and inclusive learning experiences.

Methodology

The study aims to investigate the factors contributing to low student national examination scores in Ethiopia using a desk review methodology and qualitative research methods. A desk review involves gathering and analyzing existing literature and documents on a specific study topic to identify and investigate these factors. The study utilized methods such as defining research objectives, conducting a comprehensive literature search, and extracting key information from selected literature.

The research article employed a thematic analysis approach to synthesize and analyze gathered literature, focusing on identifying common themes, patterns, and factors influencing low student performance in the national examination. This approach aimed to understand prevailing arguments, theories, and empirical evidence related to the identified factors influencing academic outcomes.

Data Analysis

Inadequate availability of high-quality educational resources negatively affects students' academic performance in Ethiopia's national test, particularly in rural and marginalized communities. Students who had restricted access to textbooks and other learning materials did badly on the national test compared to those who had sufficient resources (Abiyot et al., 2019). Instructors in rural areas had difficulty obtaining instructional resources, leading to a lack of preparation for the national test and poor student performance (Admasu et al., 2020). The lack of access to adequate education materials is especially acute in pastoralist areas, where only 5-6% of schools have access to textbooks and power (UNESCO, 2019).

Socioeconomic factors, such as poverty and parental education level, have a significant impact on students' academic achievement in the national examination in Ethiopia. Students from low-income families and those whose parents had low education levels had lower scores in the national examination compared to their peers from higher-income families and those with more educated parents (Alemu et al., 2020; Desta et al., 2018). Poverty and lack of access to basic needs negatively affected students' academic performance, particularly in rural areas where poverty rates are significantly higher than in urban areas (World Bank, 2019).

The teaching methods and pedagogical approaches in Ethiopian schools significantly contribute to students' low performance in national examinations. Tekle et al. (2019) point out the prevalence of traditional methods, leading to passive learning, while Tadesse and Alemu (2019) emphasize the lack of training in modern pedagogical approaches. Additionally, Gebrehiwot et al. (2019) highlight the challenges teachers face in implementing effective pedagogical methods due to limited resources.

The availability of infrastructure and facilities significantly impacts students' performance in Ethiopia's national examination. Alemu and Admasu (2019) point out the negative influence of poor classroom conditions on learning outcomes, while Kassahun et al. (2019) highlight the hindrance caused by the lack of access to technology.

The curriculum and assessment system significantly affect students' performance in Ethiopia's national examination. Tadesse and Asres (2019) highlight the impact of curriculum content and quality on students' understanding and retention of knowledge, while Tsegaye and Abebe (2019) emphasize the influence of assessment methods, stating that the use of multiple-choice questions can limit critical thinking skills. Continuous review and improvement of the curriculum and assessment system are essential to ensure relevance and skill measurement, as well as to equip students with the needed knowledge and skills for success.

Incomplete coverage of the curriculum negatively impacts students' performance in Ethiopia's national examination. Mamo and Assefa (2017) and Tesfaye and Alemu (2019) point out that failure to cover the entire curriculum leads to poor performance, underscoring the significance of timely completion and adequate revision opportunities for students.

The quality of teaching significantly impacts students' academic achievement in the national examination in Ethiopia. Admasu and Teshome (2019) emphasized the correlation between teachers' subject knowledge, teaching materials, and methods, and students' performance. Alemu and Fenta (2018) also highlighted the negative impact of untrained or underqualified teachers on student performance, stressing the need for continuous teacher professional development to enhance teaching skills.

School principals' leadership style is crucial for academic achievement in Ethiopia. Lack of support, capacity constraints, and ineffective leadership skills contribute to poor performance. To improve academic outcomes, regular professional development opportunities for principals are essential. (Alemu Fenta, 2019; Tadesse Assefa, 2018; MoE, 2004; Civil Service Reform Program, 2012; GEQIP plan, 2008).

Students' performance in the national examination in Ethiopia

Ethiopian students have consistently performed below the passing mark on national tests for the past decade, indicating a substandard quality of education (ETNLA, 2017). To improve this, addressing socioeconomic factors, promoting learner-centered teaching, ensuring access to quality infrastructure and technology, and investing in educational resources in rural areas are recommended. Additionally, enhancing school principals' capacity and conducting further research are important for improving academic achievement for all students.

Table 1 Students' performance in the national examination in Ethiopia, 2022 & 2023/ 2014 & 2015E.C/

Stream	Total number of examinees		50% and above			
			2022		2023	
	2022	2023	No.	%	No.	%
Natural Science	339,642	356,878	22,974	6.8	19,017	5.3%
Social science	556,878	488,221	7,060	1.3	8,250	1.7%
Total	**896,520**	**845,099**	**30,034**	**3.3%**	**27,267**	**3.2%**

Source: Document review (MoE Press Release: October 16, 2023)

The table shows the number and percentage of examinees who scored 50% and above in the national examination in Ethiopia in 2022 and 2023, broken down by stream. The Natural Science stream had 22,974 (6.8%) examinees who scored 50% and above in 2022, which decreased to 19,017 (5.3%) in 2023. The Social Science stream had 7,060 (1.3%) examinees who scored 50% and above in 2022, which increased to 8,250 (1.7%) in 2023. Overall, the total number of examinees who scored 50% and above decreased from 30,034 (3.3%) in 2022 to 27,267 (3.2%) in 2023. This suggests that there is a need for interventions to improve academic performance in both streams (MoE: Press Release, October16, 2023).

Conclusion

The existing literature identifies various factors that contribute to low academic performance in the national examination in Ethiopia, including socioeconomic factors, teaching and learning environment, curriculum and assessment strategies, and individual factors. Inadequate access to quality education resources, such as textbooks and teaching materials, is a significant barrier to students' performance. Socioeconomic factors, such as poverty and parental education level, also play a crucial role in shaping students' academic achievement. Traditional teaching methods, insufficient teacher training, and incomplete coverage of the curriculum also negatively affect students' performance.

Recommendations

To improve Ethiopian students' performance on national tests, it is important to address socioeconomic factors and provide comprehensive support. This includes promoting learner-centered teaching, ensuring access to quality infrastructure and technology, and continuously reviewing and improving the curriculum. Additionally, investing in educational resources in rural and marginalized areas, enhancing school principals' capacity, and conducting further research are recommended to enhance academic achievement for all students.

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Gender analysis of Pre-service Teachers' Intention and Motivation towards Adopting Mobile Learning

Fasanya, Hakeem Adefemi

Abstract

The study is about pre-service teachers' intention and motivation towards mobile learning. The study was conducted using 200 (100 males and 100 females) pre-service teachers of the Lagos State University, Lagos, Nigeria. Using descriptive-field method, a researcher-made Likert scale questionnaire was developed to identify the participants' intentions and motivation for mobile learning. Ten questions each were created to measure each trait. Kuder Richardson k-R 21 formula was used to confirm that the instrument is good enough for the intended use. Consequently, reliability coefficient of 0.74 was obtained. The study reveals that participants have high intentions for mobile learning and that they are motivated for mobile learning. T-test was used to examine significance of the mean difference between the male and female participants' submissions. Although, male pre-service teachers have higher mean values than female pre-service teachers in all variables, the means difference of the submissions are not statistically significant. Going by the findings, it was recommended among other things that the government should continue to encourage, support and sponsor mobile teaching trainings. Moreover, the government should take advantage of this to expand access to education by creating substantial opportunities for mobile learning education so as to be able to take in all qualified candidates into the universities.

Keywords: Gender, Pre-service Teacher, Intention, Motivation, Mobile Learning**.**

Background to the Study

Mobile learning is a form of electronic learning sometimes called e-learning. It involves the use of electronic gadgets to learn without being in a conventional classroom. The utilization of mobile devices such as Smartphones, tablets and laptop for teaching and learning continues to grow especially at the higher institutions of learning. Mobile devices can be used to transmit text, voice, video and transmit animated images in the course of teaching and learning (Thornton & Houser, 2004). As a result of these, a contemporary mode of teaching and learning has emanated and it is termed as mobile learning or m-learning. Because of the opportunity of the mobile gadgets which allows a remote interaction between the learner and the teacher, mobile learning brings about flexibility of learning for students in terms of time, attendance and learning environment (Shuja et al., 2019). This should bring about wider accessibility to education and supports the concept of education for all. However, issue of attitude cannot be ignored here. In fact, as we have learners having negative or positive attitudes towards learning in the conventional classroom environment (Mazana et al., 2019), we are bound to have such reflected also in the m-learning scenarios.

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Literature Review

Education and Technology

Education is seen as the process by which society deliberately transmits its accumulated knowledge, values, and skills from one generation to another through institutions (Mathews & Savarimuthu, 2020). Education is of various forms; it includes formal learning, such as learning under the auspices of a school or university, as well as informal learning, such as watching television programmes or documentaries, or reading books without necessarily following any scheme or curriculum. In the present study, formal education is the focus. Education is important because it helps individuals to develop their potentials and become productive members of the society (Pallas, 2000). Goel (2006) in support of the need for education for national growth observed that the quality of human resource of a nation is easily judged by the number of literate population living in it which means that education is a must if a nation aspires to achieve growth and development and also sustain it. Writing about the power of education to fight inequality, Walker et al., (2019) submitted that Education is essential for creating a more just and equal world, as it helps to reduce inequalities and empower individuals to fight for their rights.

Modern technology has made it more possible to look beyond the classroom learning arrangement to update and expand learning possibilities (Kukulska-Hulme & Traxler, 2005). No country can claim to be educationally advanced except it embraces technology for its educational activities (Yusuf, 2005). According to Harasim (2009), the internet is particularly compatible with the way students now prefer to get information. In addition, online and mobile learning encourages continuity in academics programme. Continuity is essential in achieving educational goals. Amadi and Urho (2015) analysed the effects of discontinuity in education as a result of strike actions on educational development management of Universities with a survey design. The results obtained showed irregularity of academic programmes and examination malpractice among other things as the effects of strike actions.

Theoretical Framework

The framework that is adopted for this work is the "community of inquiry" model for online learning environments developed by Garrison et al. (2000). This framework is based on the idea of three distinct "presences" namely cognitive presence, social presence, and teaching presence while also recognizing the associated overlaps among the three presences. When students are cognitively present and the teachers are available to impart knowledge, as long as a good learning environment is available, learning is bound to take place. Thus, this study proposed a framework (see Figure 1) that gives room for lecturers and students to participate in academic activities through the use of some open source computer and android applications in order to bring about new learning experiences. Summarily, the learning zone is the mobile platform and it serves as the meeting point or lecture room for the students and the lecturers alike.

Statement of the Problems

Access to education in Nigeria is an important issue that is affected by a range of factors. One of the main challenges is the lack of infrastructure or inadequate infrastructure at all levels of education. Every year, a good number of students who scored high enough in the university matriculation examination and also have good grades in their ordinary level subjects do not get admitted. The inability of Nigerian universities to accommodate qualified students into the university system due to inadequate physical facilities is militating against easy access to education and education for all.

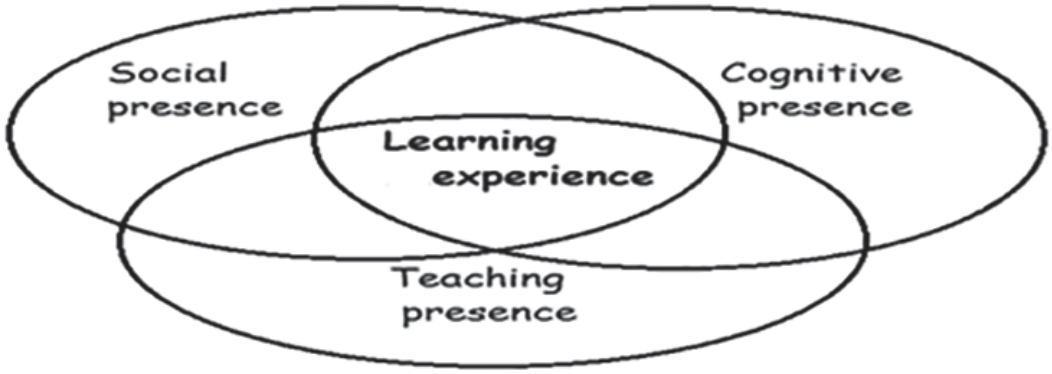

Figure 1: Community of Inquiry model (Garrison et al, 2000)

Rationale for the Study

In Nigeria, there is need to expand the learning space for higher education learning so as to accommodate the teeming population of qualified candidates who are turned down yearly due to lack of physical facilities (Jacob & Samuel, 2020) . Absolutely, the mobile learning can play a role in increasing access to education as students would not necessarily need to be physically present in the university campus. Meanwhile, students' attitude (negative or positive) is a factor of learning (Mazana et al., 2019). So, the rationale behind the present study is the need to examine students' readiness to adopt mobile learning. Moreover, researches have it that there is gender disparity in students' handling of mobile phones and other technological tools (Enconomides et al., 2008; Al-Emran & Salloum, 2017; Burnett et al, 2010). It therefore becomes imperative to find out if pre-service teachers in Nigeria are ready to use mobile apps for learning purposes and to also find out the gender difference that may exist in doing so.

Objective of the Study

The objective of this study is to find out if the Nigerian pre-service teachers have the intention and motivation towards adopting mobile learning as an alternative to conventional classroom education.

Research Questions

The following research questions were raised in the course of investigating the readiness of pre-service teachers in adopting mobile learning.

1. Do pre-service teachers have the intention for mobile learning?
2. Do pre-service teachers have the motivation for mobile learning?

Research Hypothesis

Ho1: There will be no significant gender difference in Pre-service teachers' intention to adopt mobile learning?

Ho2: There will be no significant gender difference in Pre-service teachers' motivation towards adopting mobile learning.

Scope of the Study

This study focuses on post secondary institutions of learning in Lagos state of Nigeria.

Significance of the Study

The result of this study will shed light on the students' readiness to adopt mobile learning in view of using mobile learning technology to widen the academic space and consequently pave way for more access to education.

Definition of Key Terms

Gender: The behavioral, cultural, or psychological traits typically associated with one sex (Brown, 2023)

Intention: What one plans to do or bring about (Merriam-Webster, 2023)

Mobile Learning: *Mobile learning*, also referred to as m-Learning, is a way of accessing learning content through mobile devices and without necessarily being in a physical classroom so as to accommodate distance learning (Matzavela & Alepis, 2021).

Motivation : Something that causes a person to act (Merriam-Webster, 2023)

Pre-service teacher: A Pre-service teacher is a college student who is pursuing a teacher certification (Allaire & Kamas, 2021)

Research Methodology

Method

Descriptive survey research method was adopted for the study and simple questionnaire was used to collect data with respect to Nigeria Pre-service Teachers' Attitude and Intention of Adopting Mobile Learning

Population of the study

The population of the study is composed of first year students of Lagos State University, Lagos Nigeria. They are about one thousand students.

Sample and sampling procedure

The sample size for the study is two hundred (200) respondents from the faculty of Education, Lagos State University, Lagos, Nigeria. Using stratified sampling method, 20 male pre-service teachers and 20 female pre-service teachers were randomly selected from 100 level of each of the 5 departments (educational management, Foundation and Counseling Psychology, Language, Arts and Social Science Education, Human Kinetics, Sports and Health Education, Science and Technology Education) to bring about the total respondents.

Instrument and Data Analysis

The instrument used in this study is a 20-item questionnaire designed by the researcher to collect information with respect to Nigeria Pre-service Teachers' Intention and motivation for Adopting Mobile Learning. The

questionnaire was divided into three sections. Section A was designed to collect information about the respondent's Demographic / Bio Data. Section B of the questionnaire elicits information on respondents' intention towards adopting mobile learning and section C measures motivation level of the respondents towards adopting mobile learning. Data Analysis was done using frequency counts and simple percentage. The T-test statistics was used to test the validity of research hypotheses.

Results

Respondents Demographic Distribution

Table 1 Respondents' Gender Distribution

Gender	Frequency	Percentage
Male	100	50
Female	100	50
Total	**200**	**100**

Source: Author's Survey, 2023

Table 1 above shows the distribution of respondents by gender. Out of the 200 respondents, 100(50%) were male pre-service teachers and 100(50%) were female pre-service teachers.

Data Analyses

Research Question 1: Do pre-service teachers have the intention for mobile learning?

Table 2 Response of pre-service teachers' intention for mobile learning

	Intention for Mobile Learning	SA	A	D	SD	Total	Mean	Stand. Dev	Remark
		4	**3**	**2**	**1**				
1.	Mobile devices are helpful for learning	65 (32.5%)	71 (35.5%)	35 (17.5%)	29 (14.5%)	200	18	18.2	Agree
2.	I am willing to use mobile learning programs	62 (31%)	74 (37%)	36 (18%)	28 (19%)	200	18	18.7	Agree
3.	Mobile learning is a good way to learn.	66 (33%)	73 (36.5%)	36 (18%)	25 (12.5%)	200	19.5	20	Agree

(*Continued*)

4.	Mobile learning can supplement traditional learning methods	66 (33%)	70 (35%)	35 (17.5%)	29 (14.5%)	200	18	18.2	Agree
5.	I prefer using mobile devices to access course materials than using traditional methods	65 (32.5%)	72 (36%)	35 (17.5%)	28 (14%)	200	18.5	18.8	Agree
6.	I intend to continue to use mobile learning for academic goals achievement	63 (31.5%)	74 (37.0%)	34 (17.0%)	29 (14.5%)	200	18.5	19	Agree
7.	I intend to stay organized and keep track of all my assignments using mobile learning.	62 (31.0%)	74 (37.0%)	36 (18.0%)	28 (14.0%)	200	18	18.7	Agree
8.	I am confident about my ability to engage in mobile learning	65 (32.5%)	71 (35.5%)	35 (17.5%)	29 (14.5%)	200	18	18.2	Agree
9.	I am enthusiastic about using Mobile learning and its opportunities to achieve great academic results	66 (33.0%)	73 (36.5%)	36 (18.0%)	25	200	19.5	20	Agree
10.	Mobile learning can make one to gain knowledge more quickly than the conventional method.	66 (33.0%)	70 (35%)	35 (17.5%)	29 (14.5%)	200	18	18.2	Agree
		2584	2166	706	281	5737			
	Grand Total	4750 (82.8%)		987 (17.2%)		5737			

Source: Author's survey, 2023

In Table 2, the summary is that 82.8% of the participants' responses indicated that they have positive intentions for mobile learning while 17.2% responses reflected lack of intention for mobile learning. In line with this observation, we can say that the pre-service teachers have intentions to adopt mobile learning.

Research Question 2: **Do pre-service teachers have the required motivation for mobile learning?**

Table 3 Teachers' response to motivation for mobile learning based on gender

	Motivation for Mobile Learning	SA	A	D	SD	Total	Mean Dev	Stand. Dev	Remark
		4	3	2	1				
21	I can text my lecturers/ facilitators if I have difficulties with mobile lesson.	68 (34.0%)	71 (35.5%)	33 (17.0%)	28 (14.0%)	200	9.75	10.6	Agree
22	I can engage in online lessons either through my personal computer or phones	62 (31.0%)	72 (36.0%)	38 (19.0%)	28 (14.0%)	200	8.5	9.56	Agree
23	I easily access mobile lesson anywhere	67 (33.5%)	75 (37.5%)	33 (17.0%)	25 (12.5%)	200	10.5	11.4	Agree
24	I enjoy learning using a mobile device because I can study mathematics anytime and anywhere without limited space and time	64 (32.0%)	73 (36.5%)	36 (18.0%)	27 (13.5%)	200	9.25	10.2	Agree
25	With mobile learning, new knowledge is bound to be discovered besides what one can get from the textbook and classroom learning	61 (30.5%)	72 (36.0%)	39 (20.0%)	28 (14.0%)	200	8.25	9.64	Agree
26	I like to participate actively in online discussions in virtual classes	70 (35.0%)	69 (34.5%)	34 (17.0%)	27 (13.5%)	200	9.75	10.6	Agree
27	Mobile learning gives room for autonomous learning which removes distraction	68 (34.0%)	69 (34.5%)	34 (17.0%)	29	200	9.25	10.2	Agree
28	Mobile learning is bound to bring out the best in any serious-minded student.	65 (32.5%)	70 (35.0%)	37 (19.0%)	28 (14.0%)	200	8.75	9.65	Agree

(*Continued*)

29	Mobile learning is an interesting mode of learning	78 (39.0%)	68 (34.0%)	31 (16.0%)	23 (11.5%)	200	11.5	12.6	Agree
30	Mobile learning applications should be developed and adopted by all institution of learning	72 (36.0%)	68 (34.0%)	35 (18.0%)	25 (12.5%)	200	10	10.9	Agree
	Total	675	707	350	268				
	Grand total	1382 (69.1%)		618 (30.9%)					

In table 3 above, looking at pre-service teachers' responses to the questionnaire on motivation for mobile learning. Precisely, 69.1% of the participants' responses indicated that they are motivated towards mobile learning while 30.9% responses reflected lack of motivation in one way or the other for mobile learning. Going by this finding, with high positive response against the low negative response, we can again say that the pre-service teachers have the necessary motivation required for mobile learning.

Research Hypotheses

Ho1: There will be no significant gender difference in Pre-service teachers' intention for mobile learning

Table 4 T-test table of teachers' response to intention for mobile learning based on gender

Group	N	Mean	S.d	P	Df	T-test calc.	T-test crit.	Decision
Male	100	29.00	3,52	0.05	198	1.13	1.96	Null hypothesis not rejected
Female	100	28.37	2.45					

Source: Author's Computation, 2023

In table 4 above the male pre-service teachers had slightly higher positive submissions (mean =29.00) than female Pre-service teachers (mean = 28.37). However, at significant level 0.05 and degree of freedom 198, the calculated T-test value (1.13) is less than the critical value (1.96). This implies that the difference between the mean score of male and female students is not statistically significant. So, the null hypothesis 1, which states that there will be no significant difference in Pre-service teachers' intention for mobile learning based on gender, is upheld.

Ho2: There will be no significant gender difference in Pre-service teachers' motivation towards mobile learning.

Table 5	T-test table of teachers' response to motivation for mobile learning based on gender							
Group	**N**	**Mean**	**S.d**	**P**	**Df**	**T-test calc.**	**T-test crit.**	**Decision**
Male	100	28.94	4.67	0.05	198	0.42	1.96	Null hypothesis not rejected
Female	100	28.66	4.73					

Source: Author's Computation, 2023

In table 5, male pre-service teachers shows slightly higher motivation prowess (mean =28.94) than female pre-service teachers (mean = 28.66). However, at significant level 0.05 and degree of freedom 198, the calculated T-test value (0.42) is less than the critical value (1.96). The implication of this is that the difference between the mean response of male and female students is not statistically significant. So, the null hypothesis 2, which states that there will be no significant difference in Pre-service teachers' motivation for mobile learning based on gender, is not rejected.

Discussion of Findings

This study found that participants have the necessary foundational skills and gadgets for engagement in mobile learning. Assessing the participants' intention for mobile learning according to gender, both male pre-service teachers and female pre-service teachers show higher positive response than negative response. So, pre-service teachers have intention for mobile learning. Nevertheless, the male pre-service teachers showed higher mean value of intention for mobile learning than the female pre-service teachers while the difference between the observed mean values is not statistically significant. This result is consistent with the result of the study done by Lin et.al. (2020); Students in Taiwan and Vietnam generally showed intention and confidence in their ability to accept and perform a specific task using Mobile learning. Furthermore, using structural equation modeling technique and the Linear Structural Relationship (LISREL) program, Park et.al (2012) carried out investigation on university students' behavioral intention for mobile learning. It was concluded that students in Taiwan have high level of acceptance of m-learning. A study by Tan et al. (2012) on empirical analysis of the determinant of mobile learning adoption also found that gender factor did not show significant effect on intention for mobile learning. Another concept assessed in the course of the study is participants' motivation towards mobile learning. The study found that pre-service-teachers show more responses indicating that they are motivated to engage in mobile learning than otherwise. Also, the male pre-service teachers submitted responses supporting higher motivation towards mobile learning than the female pre-service teachers but the difference between the mean responses is also not statistically significant. This is in agreement with the study "mobile game-based learning with a mobile app, motivational effects and learning performance" carried out by Huang et al. (2017).

Conclusion

Mobile devices have many features that make them exciting platforms for learning: their computing power, their affordability, the ability to carry and use them everywhere and the affection they inspire in young people. Based on the results of the analysis of the present study, it is concluded that pre-service teachers

have the skills and experiences necessary for mobile learning and both male pre-service teachers and female pre-service teachers have the intention and motivation required for engaging in mobile learning. The result of this study is in agreement with the study by Odede (2021) which showed that the students have positive perceptions towards m-learning and possess the confidence needed in using m-learning solutions. It is also in accord with the study done by Abu-Al-Aish et al (2012) which found that students have a positive perspective of using Mobile-learning and they look at it as a support system for traditional class-based learning. So, mobile learning can be used to increase access to education in Nigeria.

Recommendation

Based on the findings of this study, the following recommendations are made

1) The university lecturers should make efforts to acquire enough skills needed for the use of mobile teaching and learning.

2) The university managements in Nigeria should fully integrate mobile-learning solutions to academic programmes.

3) The provision of technical assistance must be considered in the university implementation readiness of the institutions towards integrating mobile-learning into educational and academic programmes.

4) The government agencies concerned with the responsibility of managing the development of education in the country should see the students' readiness for adopting mobile learning as an opportunity to expand the education leaning space to accommodate prospective qualified candidates.

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Experience as Reconstruction— Actionable Insights into Pedagogy

Dr. Neelam Mehta Bali

Abstract

Human experience serves as a 'launching pad' which puts different thought constructs into orbit. Amidst the myriad forms, it is Dewey's 'Reconstructionism which perhaps emerges as a strong exponent of experience. His thought process addresses some pertinent questions such as, "What is the scope of experience and what are its limitations ? How far is it a sure ground of belief and safe guide of human conduct ? "Is there anything inherent in experience which tends towards progressive organization of its contents ?" "Can it organize itself into stable courses or must it be sustained from outside ?", etc. In the present time the volatility and uncertainty of circumstances makes it necessary that pedagogy facilitates PAIRRs experience, wherein P represents perception of occurrence of experience, A stands for its analysis, I for interpretation and R for reflection on experience along with R, for owning up the responsibility of the experience. It goes without saying that the occurrence of experience is incumbent upon active engagement of the person in an organically connected dynamic world of his or her existence. Reconstruction represents conscious differentiation between the means and ends with reference to the ever evolving perception of the self and purpose of life in an ever changing environment within and outside the person. Dewey's analysis and interpretation is expected to provide the educators with actionable insights into pedagogy.

Keywords: Experience, Means, Ends, Reconstruction, Environment, Continuity, Consciousness, Interaction, Meaning.

The Perspective

Theodore Brameld, observes: WE are living in an age that is capable, on the one hand of destroying mankind overnight and on the other hand, of producing a higher level of civilization on a world scale". The former is the road to destruction and the latter, the path of Reconstruction. Reconstructionism is a philosophy of "search for value orientation" sought through the identification of "means" and "ends" in the "defining of purposes". The defining of purpose is suggestive of a desired change or flux in a "situation" obtained through reorganisation or realignment of its constitutive elements (a) per se and (b) their interpretation, understanding or "meaning" for "self" (by virtue of which the element once held as an 'end' acquires the significance of 'means' in a changed"situation"). Reconstructionists emphasize "that means are also shaped by the ends we decide upon and commit ourselves to."[2] In the wake of this 'commitment' Brameld takes notice of man's' 'tremendously powerful irrational drives, both within himself and in his relations with other men."[3]

These lush pastures of human conduct were of primary interest to Dewey. His endeavour was to 'read' experience in a manner as to ensure "a higher quality of experience on the part of a greater number".[4] Reviewing the characteristic feature of experience, as growth, he saw it (experience) as "development in a particular line."

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According to Dewey, "An experience is always what it is because of a transaction taking place between an individual and what at the time constitutes his environment."[4] The environmental conditions of the individual are defined by his personal needs, desires, purposes and capacities to create the experience which is had." The individual who acts and undergoes, emerges as a modified being after every experience enacted or engaged in. The modification or transformation is affected because, in the course of the experience, the individual assimilates the 'consequences undergone because of doing' as the meaning of the subsequent doing and manifests it as a habit in his behaviour. It modifies the individual by preparing more and "changing the ground" for further experience. Thus "continuity and interaction in their active union" with each other provide an index of the value of an experience.

The Criteria of Experience- Dewey evolved the criteria of Experience in terms of two basic principles, the principles of Continuity and Interaction. The first of these, the Principle of Continuity of experience implies that "every experience takes up something from those which have gone before and modifies in some way the quality of those experiences which come after".[5] At the same time Dewey also observes that while the Principle of continuity applies in some way in every case, the quality of the present experience influences the way in which the Principle applies.[6] In this context Dewey's some other pertinent observations are:

> "all human experience is ultimately social, that it involves contact and communication"[7]

Another of his contentions that "every experience enacted and undergone modifies, the one who acts and undergoes" is a "basic characteristic of habit"[8] Habit as we shall see later has been identified by Dewey as an essential characteristic of human behaviour and therefore plays a significant role in his experiences.

Within the parameter of his work, Experience and Education, Dewey has observed that "Experience does not go simply inside a person. It does go on there, for it influences the formation of attitudes, of desire and purpose. (However) every genuine experience has an active side which changes to some degree, the objective conditions, sources outside an individual which give rise to experience. It is constantly fed from these springs."[9]

While the quality of experience is the ticket to the continuity of experience viz-a-viz the person, the content of the experience is the venue of continuity between the person and the objective conditions. 'Principle of Interaction', the second principle provides the vista of this continuity. It is this second principle, that together with the first, forms the criteria of experience. Interaction "assigns equal rights to both factors in experience-objective and internal conditions. Taken together, or in their interaction, they form what we call a situation."[10]

The expression 'objective condition' needs some elaboration here. Identifying their nature Dewey say's, "The environment is whatever conditions interact with personal needs, desires, purposes and capacities to create the experience which is had."[11] The objective conditions include (a) the social responses, the action and the manner (b) The physical world and (c) The total social set up. In other words, these conditions "include what is done (by educator) ....and the way in which it is done…the material with which the individual interacts, and most important of all, the total social set up of the situation in which a person is engaged."[12]

The importance of these (objective) conditions can never be overestimated. Dewey says, "Conditions….. give each present experience a worthwhile meaning.."[13] Meaning of an experience, is the crux of Dewey's experience. It gives experience the quality of agreeableness or disagreeableness. It is the vehicle of continuity

of experience, of the person, within and with the situation. Thus Dewey observes, "every experience should do something to prepare a person for later experiences of a deeper and more expansive quality. That is the very meaning of growth, continuity and reconstruction of experience."[14]

Besides these two principles or the Criteria as given in his work, 'Experience and Education', more insight about the nature of experience are found in Dewey's other works namely., 'Art as Experience' and 'Experience and Nature'.The elements/criteria of experience construed from these consists of : (a) Principle of Continuity (b) Principle of Interaction-Situation (c) Reconstruction -bridging the gulf. and (d) Transformation –the change effected.

Principle of Continuity –Elaborated. The significance of the Principle of Continuity as perceived by Dewey stands self explained in what he describes as 'form of an integral experience. In his words:

> "In every integral experience there is form because there is dynamic organisation. I call the organisation dynamic because it takes time to complete it, because it is growing. There is inception, development and fulfilment. Material is ingested and digested through interaction with that vital organisation of the results of prior experience that constitutes the mind of the worker. Incubation goes on until what is conceived is brought forth and is rendered perceptible as part of the common world."[15]

Dewey observes: "Life itself consists of phases in which the organism falls out of step with the march of surrounding things and then recovers in unison with it either through effect or by some happy chance."[16]

However, if this, conscious intent is reduced to labelling situations, events and objects as so-and- so in mere succession, then it marks the cessation of a life that is a conscious experience. this act of labelling represents 'distraction and dispersion' in contrast with an experience when continuities are realised in an individual, though discrete forms,'[17] when "the material experienced runs its course to fulfillment…its close is a consummation and not a cessation, (it) is a whole and carries with it, its own individualising quality and self sufficiency".[18] then and then only is it "integrated within and demarcated in the general stream of experience from other experiences."[19]

Realisation of continuities, in ordinary conditions or in conditions of resistance and conflict, is the foundation stone on which the building of experience is constructed. Thus "experience is necessarily cumulative and its subject matter gains expressiveness because of cumulative continuity. The world we have experienced becomes an integral part of the self that acts and is acted upon in further experience"[20]

The laying of the foundation stone in the words of Rodman Webb is the "presence of the past." It is attended by consciousness which marks the place where the formed disposition and the immediate situation happen to interact. It is the "continuous readjustment of the self and the world in experience."[21] It is relevant here to ask what disposition stands for. Are these 'formed dispositions'- the living fossils of the past ? Perhaps yes, for Dewey observes:

> "In their physical occurrence, things and events that are experienced- pass and are gone. But something of their meaning and value is retained as an integral part of the self. Through habits formed in the interaction with the world, we also in-habit the world. It becomes a home and the home is part of our every experience."[22]

In his work, Human Nature and Conduct, Dewey qualifies how through habits…we in-habit the world. Dewey says, "all habits are demands for certain kinds of activity, and they constitute the Self. In any intelligible sense of the Will, they are the Will. They form our effective desires and they furnish us with our working capacities."[23] Investing habits with an expanded functionality he adds, "concrete habits do all the perceiving, recognizing, imagining, recalling, judging, conceiving and reasoning that is done."[24]

Here one feels tempted to wonder whether habits would lead to a highly fixed, structured and rigid conduct. Foreseeing this dilemma of rigidity as an offshoot of permanency of habits, Dewey states:

> "By a seeming paradox, increased power of forming habits means increased susceptibility, sensitiveness, responsiveness. Thus even if we think of habits as so many grooves, the power to acquire many and varied grooves denotes high sensitivity, explosiveness. Thereby an old habit, a fixed groove if one wishes to exaggerate, gets in the way of the process of forming a new habit while the tendency to form a new one cuts across the same old habits."[25]

The role of consciousness acquires a unique position in the gamut of experience. Dewey tries to associate habits and consciousness. He says that the function of habits, phenomena of their formation, operation, their interruption and re-organisation are expressed by consciousness, "whether as a stream or as special sensations and images".[26]

Here the term consciousness is not to be taken in the sense the idealist or the subjectivist would have it. His definition of consciousness as sensation shows his biological orientation as also another of his statements, "by some physiological process, not exactly understood at present but to which the name habit is given, the net outcome of prior experiences gives a dominant quality, designated 'promontory' to a perceived existence."[27]

Taken in the biological sense or otherwise, consciousness is "more acute and intense in the degree of the readjustments that are demanded, approaching the nil as the contact is frictionless and interaction fluid, it is turbid when meanings are undergoing reconstruction in an undetermined direction and become clear as a decisive meaning emerges."[28]

Thus, establishing continuity in and among experiences is essentially a process of establishing meaning.

Principle of Interaction -Situation: The statement that individuals live in a world means…..that they live in a series of situations. And when it is said that 'men live in these situations', the meaning of the word "in" is different from its meaning when it is said that pennies are 'in a pocket' or 'paint is in a can'. The point of difference between the two situations is the presence of interaction in the former. "It means …that interaction is an ongoing process…The conception of situation and interaction are inseparable from each other."[29]

Placing the 'individual' in a situation Dewey recognizes that the "individual is an organism who acts with reference to a time spread, a serial order of events, as a unit, just as it does in reference to a unified spatial variety. An environment, both extensive and enduring, is immediately implicated in present behaviour." Thus, "the action called 'organic' is not just that of internal structures, it is an integration of organic-environmental connections."[30]

The concept of interaction finds more elaboration in the observation that, "Experience in the degree to which it is experienced is heightened vitality …..it signifies active and alert commerce with the world, at its height it signifies complete inter-penetration of self and the world of objects and events."[31] For Dewey, it is the

fulfillment of an organism in its struggles and achievements in a world of things.Herein, the use of adjectives like "heightened vitality", "active and alert commerce", "struggles and achievements" are all suggestive of active relations subsisting between a human being and his natural and social surroundings.

As regards the initiation of these relations, Dewey states that in some cases it is "on the side of the environment, the human being undergoes or suffers certain checking and deflections of endeavours," while in other cases, "the behaviour of surrounding things and persons carries to a successful issue the active tendencies of the individual, so that in the end what the individual undergoes are consequences which he has himself tried to produce."[32]

Wherein lies the significance of these relations ? Dewey replies, "In just the degree in which the connections are established between what happens to a person and what he does in response, that is undergoing and doing and between what he does to his environment and what it does in response to him, that is doing and undergoing, his acts and things about him acquire meaning."[33] According to Dewey, in the total event "reason ceases to be a remote and ideal faculty, rather, it signifies all the resources by which activity is made fruitful in meaning and experience" ceases to be "empirical and becomes experimental."[34]

Experience as the perception of the connection between something tried and something undergone in consequence qualifies as a process. The perception of these relations is dependent upon man's consciousness of the relations found in nature, the distinguishing contribution of man. Dewey recognizes that, "Through consciousness, he (man) converts the relation of cause and effect that one observed in nature into relations of means and consequences."[35] He identifies consciousness with the 'inception of such transformation' where resistance becomes something to be used in changing existing arrangements of matter."[36]

Describing other characteristics associated with this transformation Dewey states that in it, "human energy gathers, is released, dammed up, frustrated and victorious. There are rhythmic beats of wants and fulfillment, pulses of doing and being withheld from doing."[37]

Highlighting the contribution of moments of contrast, (as in a drama) Dewey points out that drama is responsible for giving experience a design and pattern, because "drama is an enhancement of the conditions of consciousness."[38] One aspect of the drama is, the need of supplementation.It is indicative of an actual or impending break or discontinuity. It gives the total event a unifying quality to which Dewey gives the term 'emotion'. Underlining its significance, he observes, "The discord is the occasion that induces reflection. Desire for the restoration of the union converts mere emotion into interest in objects as conditions of realization of harmony."[39]

Thus the whole process so far has been one of transformation of:

a. Wants into fulfillment,

b. Relation of cause and effect into relation of "means and ends."[40] and

c. Emotion into interest. The common demand of these transformations is "focalization of meanings."

The situation in which we seek the "focalization of meaning" is not an insulated and isolated system of objects, events and persons. "Any experience" says Dewey, "has an indefinite total setting" He observes that the "things, objects are only focal points of a here and now, in a whole that stretches out indefinitely."[41]

Describing the relationship of these 'focal points' to the total settings, he states that the latter is "the qualitative background, which is defined and made definitely conscious in particular objects and specified properties and qualities."[42] As regards the quality of their relationship Dewey observes that, "there is something mystical associated with the word intuition, and any experience becomes mystical in the degree in which the sense, the feeling of the unlimited envelope becomes intense." However, there is always a "bounding horizon which moves as we move and consequently we are never wholly free from the sense of something that lies beyond."[43]

Regarding the selection of the focal points Dewey states that," if we observe the entire field, from bright focus through the fire-conscious, the fringe to what is dim, sub-conscious, feeling the focus corresponds to the point of immediate need of urgency, the "fringe" corresponds to things that just have been reacted to or that will soon require to be looked after, while the remote outlying field corresponds to what does not have to be modified and which may be dependently counted upon in dealing with immediate need."[44]

Another important thing with regard to 'focal points' is their temperarity in a world of flux. Highlighting this aspect Dewey says that, "the scope and content of the focussed apparency have immediate dynamic connections with portions of experience not at (the) time obvious."[45] (sic) In his work 'Art as experience' Dewey observes that these things which form the horizon are, the capital with which the "self notes, cares for, attends and purposes".* It is in this substantial sense, that mind forms that active background upon which very new contact with surroundings is projected. In the projection of the new upon it, "there is assimilation and reconstruction of both background and what is taken in and digested."[46] It may seem here that Dewey has made a leap from the talk of horizon to that of the mind, but this leap appears to be so only if we overlook the mention of the self which Dewey has earlier identified in terms of habits, dispositions, attitudes, desires and will.

In the present situation we are faced with the demand of reconstruction of the context of habitual meanings(mind) which is organically related to consciousness,(which is) "that phase of a system of meanings which at a given point of time is undergoing re-direction, or transitive transformation."[47] This brings us to the conclusive part of this exposition of the principle of Interaction-Situation which aphoristically has been put as –

> "It would be much more direct to say that a self is contained in a perception then that a perception is presented to a self."[48]

Reconstruction– Bridging the Gulf: Dewey holds that it is possible to be efficient in action and yet not have a conscious experience. "The activity is too automatic to permit of a sense of what it is about and where it is going."[49] And "between the poles of aimlessness and mechanical efficiency, there lie those courses of action in which through successive deeds there runs a sense of growing meaning conserved and accumulating towards an end that is felt as accomplishment of a process."[50]

In the process of every experience Dewey identifies an element of undergoing, and 'of suffering' in its large sense. He explains "otherwise there would be no taking in of what preceded, for "taking in" in any vital experience is something more than placing something on the top of consciousness over what was previously known."[51]

In order to understand the nature of reconstruction, let us take account of this statement, "An experience has pattern and structure, because it is not just doing and undergoing in alteration but consists of them in relationship. The scope and content of the relations measure the significant content of an experience."[52]

Perception, according to Dewey, is an act of going out of energy in order to receive, but if it is withheld from receiving before it gets a chance to develop freely, then it is arrested at the stage of recognition. And it is

this which is the pace-maker in the life of experience. This imputation of meaning of reconstruction, stands supported by Dewey's observation that:

> "The consequences undergone because of doing are incorporated as the meaning of subsequent doings because the relation between doing and undergoing is perceived."[53]

Thus the activity is transformed in its significance, an 'end' becomes a 'mean'. The relationship or transformation can be further understood with a personal experience. The action of hitting the fist on the wall registers pain as a consequence, in subsequent experiences, pain becomes so much an integral part of the action that it becomes the bearer of the meaning of the action.

Dewey holds that "perception of relationship between what is done and what is undergone constitutes the work of intelligence."[54] At the same time he also mentions that in a vital experience it is not possible to divide from one another, the practical, emotional and intellectual, and to set the properties of one against the characteristics of the others. "The emotional phase binds parts together into a single whole, "intellectual" simply names the fact that the experience has meaning, "practical indicates that the organism is interacting with events and objects which surround it."[55]

Qualifying the above statement, he says that the practical, emotional and intellectual are the terms we coin when we reflect or think about our experience and not when we have it. The reason being that in total normal experience—

> "Both inner and outer factors are so incorporated that each has lost its special character….things and events belonging to the world, physical and social are transformed through its inter-course with things previously external to it."[56]

These are the echoes of the twin principles of continuity and 'situation-interaction,' and remind that reconstruction is not separated from them in time, it is a simultaneous process and therefore the consummation of the integral experience 'does not wait in the consciousness,' for the whole undertaking to be finished. "It is anticipated throughout and is recurrently savoured with special intensity."[57]

The total account has revealed itself as one of 'ordered and organized movement' culminating in 'internal integration,' and rounding up the entire activity with a satisfying emotional quality marking its fulfilment, as an experience, an integral experience. In their vital sense these real experiences are complete in themselves (itself), "standing out because marked out from what went before and what came after."[58] The manner however is not one of 'dissection' but one of 'succession.' At this juncture we can ill afford to omit this account which so succinctly records the process of experience as series of succession in which:

> "Every successive part flows freely, without seam and without unfilled blanks into what ensues. At the same time there is no sacrifice of the self-identity of the parts. In an experience,...as one part carries on what went before, each gains distinctness in itself…because of continuous merging. There are pauses, places of rest, but they punctuate and define the quality of movement."[59]

Transformation effected: From the experiential 'interaction-situation' the individual emerges transformed. As a consequence of reconstruction, each experience makes its contribution to the quality of movement of Life, by way of providing it with ever new meanings and values. In this manner every individual assimilating the past experience has, in a special sense, a scale of funded meanings and values to measure the value of,

'possible experiences' and then decide to 'have it.' It is a different matter though, that, of these "some things (values) sink deep while others stay on the surface and are easily displaced."[60]

The "possible experiences" which are estimated to be of worth become manifest in an individual's expression on the occasion when he chooses to have it (the experience) in a particular situation. It is "an objective result as well as a personal act." This alone explains why the "lines and colour" in the work of an artist "arrange themselves in one pattern and rhythm rather than in another,"[61] As a personal act the experience becomes unique in itself and to the experiencer. Dewey observes, "when an activity is continued into the undergoing of consequences, when the change made by action is reflected back into a change made in us… the mere flux is loaded with significance. We learn something."[62]

A well pronounced contention of Dewey that merits mention is, "only by progressive organisation of inner and outer material in organic connection with each other, can anything be produced that is not a learned document or an illustration of something familiar."[63]

In a concluding statement, Dewey states:

> "It is not true that we forget or drop into unconsciousness only alien and disagreeable things. It is even more true that the things which we have most completely made part of ourselves, that we have assimilated to compose our personality and not merely retained as incidents, cease to have a separate conscious existence."[64]

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Teaching Strategies in Visual Text Interpretation in Higher Education

Judelin S. Alvarez

Introduction

Visual literacy is an essential skill in the 21st century, as visual communication has become an integral part of our daily lives. It involves the ability to use and create visual media to communicate ideas and information. In the educational context, visual literacy can enhance critical thinking skills, promote creativity, and improve learning outcomes (Huang, 2018). Visual literacy can also foster empathy and promote cultural understanding by exposing students to different perspectives and ways of life (Thibodeaux, 2019).

Visual literacy in higher education curriculum in the Philippines is an area of growing interest, as there is a growing recognition of the importance of visual communication in today's digital age. However, according to Amatorio and Ramboyong (2018), visual literacy is not commonly integrated into higher education curriculum in the Philippines. The study revealed that there is a lack of awareness among instructors and students of the importance of visual literacy in higher education. In addition, the study found that there is a need for training and resources, such as visual aids and materials, to effectively integrate visual literacy into the curriculum.

De Leon and Borabo (2021) also focused on the role of visual literacy in enhancing the critical thinking skills of higher education students in the Philippines. The study highlights the need for visual literacy in higher education, as it can enhance critical thinking skills, facilitate learning, and prepare students for the demands of the 21st-century workforce. These challenges can result to a lack of proficiency in understanding and analyzing visual information, such as images, graphs, charts, and diagrams (Liu, 2013).

Also, it can cause several impacts to tertiary students, particularly in academics, communication, and even professional development. It can hinder students' ability to engage with visual materials used in various academic disciplines, leading to reduced comprehension and performance (Cohen & Weitzman, 2019). Inadequate visual literacy skills can impede students' ability to effectively communicate ideas using visual aids, restricting their capacity to convey complex information (Doyle, 2017).

Limited emphasis on visual literacy in the curriculum and inadequate instruction on visual analysis and interpretation contribute to students' lack of visual literacy skills (Gilliam, 2020). The last is technological dependence. Overreliance on automated design tools and software can result in a lack of understanding of fundamental visual principles and design concepts (Locher, 2015). These challenges should be addressed immediately by integrated visual literacy in the curriculum. Incorporating visual literacy instruction across disciplines can enhance the students' ability to analyze and communicate through visual means (Cox, 2021). Utilizing active learning approaches is another initiative to consider. Encouraging interactive and hands-on activities, such as visual analysis exercises and collaborative design projects, can foster visual literacy skills (Brumberger, 2011). Lastly, is the faculty development. Providing professional development opportunities

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for educators to enhance their own visual literacy skills can improve instruction and mentorship in this area (Stahl & King, 2020).

To address the gap in the integration of visual literacy in higher education curriculum in the Philippines, Amatorio and Ramboyong (2018) suggested that higher education institutions should develop programs and workshops that promote the importance of visual literacy and train instructors on how to integrate visual literacy into their teaching. Hence, this study.

Research Objectives

The study delved into the teaching and interpreting of visual texts in higher education. Specifically, aimed to achieve the following.

1. Identified the visual literacy strategies that teachers use in teaching Art Appreciation.
2. Determined the specific visual strategies that students use in interpreting visual texts in learning Art Appreciation.

Research Design

This study used qualitative content analysis since key themes emerged from written outputs of participants in artwork and photo text interpretation. Transcribed interviews of teacher and student participants were coded and analyzed (Hoffman et al, 2011). Guo et al. (2019) has outlined content analysis as a study tool for spotting trends in transcripts of spoken or written interactions.

Research Locale and Participants

The study was conducted in a State College in the Bicol region. The institution was purposely chosen since it offers GEC-5 Art Appreciation, a general education course offered to all freshmen students every first semester of the academic year. Art Appreciation is a three-unit course that develops learners' ability to appreciate, analyze, and critique works of art.

The participants of this study were five teachers and twenty-five freshmen students, for a total of 30 participants selected through purposive sampling.

Data Gathering Procedure

The researcher sought the approval from the College President thru the Vice President for Academic Affairs of a State College to gather data from the respondents. After getting the approval, the researcher sought individual consent from the teacher participants who were teaching GEC 5 – Arts Appreciation course. Upon their approval, the researcher administered the interview and retrieved the needed data.

The research has five phases: Phase 1: Performing visual interpretation activities and assessment of students' output. Phase 2: Conducting semi-structured interview; Phase 3: Data collection, Analysis, and Interpretation; and Phase 4 Development of pedagogical model.

Research Instrument

Semi-structured interviews were conducted with the five teachers and twenty-five student participants. The teacher and student participants were asked questions from different interview guides. These questions were validated by the specified expert in the study as to their correctness, validity, and appropriateness. In addition, the validation ensured that the interview guide questions can answer the statement of the problem. Thus, the semi-structured interview questions were revised and validated by an associate professor at one of the state universities in Camarines Sur.

Data Analysis

The study used deductive qualitative data analysis. Deductive analysis, as defined by Bingham and Witkowsky (2022), entails using evidence to put hypotheses to the test. One way of looking at it is as a "top-down" method of analyzing data.

The first research question, "What teaching strategies do teachers use to develop students' visual strategy?", was responded to by the teacher and student participants. Individual semi-structured structured interviews were conducted to obtain sufficient data from both participants. Each of their answers was coded using Callow's (2005) Three Dimension Model, namely: affective, compositional, and critical, and Abas' (2019) Four Phases in Teaching Visual Analysis, namely: The Exposure Phase, The Exploration Phase, The Engagement Phase and The Self-Reflection Phase. The second research question, "What specific visual strategies do students use in interpreting multimodal texts?" was both answered by the teacher and student participants. Both of their answers in the semi-structured interview were coded using Liu's (2013) Visual Interpretive Strategies – meta-interpretive strategy, perceptual strategy, analytical strategy, and socio-cultural strategy.

Methodological Limitations

Due to CoVid-19 pandemic, the last half of the 2nd semester of School Year 2019-2020 was done via flexible learning; thus, classroom observation was not conducted. Artworks and photos were the visual texts used in the study. But other than these, different types of visual texts such as moving pictures could have been used if face-to-face instruction was possible. A weekly classroom observation or eight classroom observations tantamount to two months could have been done so that enough data could be gathered, but as it is, the focus of this study was on the content analysis of student's visual text interpretation.

Results and Discussion

Teaching Strategies to Develop Students' Visual Literacy

Table 1a on the next page presents the first stage, the **Initiation Stage** in the teaching strategies to develop students' visual literacy based on the 12 statements from the teacher participants and 24 statements from the student participants which were gathered from the interviews. Table 1a reveals that the top 3 strategies according to the replies of the teachers and students include providing visual and giving explanation (41%), followed by asking for message, purpose and intended audience of the image (26%), and getting students' first impression (24%).

Table 1a Stage 1 of the Teaching Strategies to Develop Students' Visual Literacy

Themes	Activities							Total
I. Initiation stage Presentation of Topic	**Teachers**	**F**	**%**	**Students**	**F**	**%**	**F**	**%**
Providing visuals and giving explanation	Teachers showed visual texts in class and provided explanations about it.	4	33%	On the students' perspectives, their teachers provided visuals and explained them.	10	42%	14	41%
Asking for message, purpose and intended audience of the image.	Teachers asked questions from lower-order to higher-order thinking skills.	3	25%	According to the students, their teachers asked them questions.	6	25%	9	26%
Getting students' first impression	Teachers asked students what they can see and their impression to the visual presented.	2	17%	Students expressed that their teachers ask them about their impressions.	6	25%	8	24%
Asking students' feelings	A teacher asked students about their feelings upon seeing the artwork.	1	8%	Students expressed their feelings about the visual texts.	2	8%	3	9%
Probing understanding about the image context	Teachers asked questions that describe the context of the image.	2	17%					
TOTAL		12	100%		24	100%	34	100%

Providing visuals and giving explanations are deemed advantageous in improving students' visual literacy. As Jandhyala (2017) emphasized, visual texts enable students to comprehend materials and engage in effective communication. Also, Anstey and Bull (2006), Jaffe (2011), Comminos (2012), and Kim et al. (2017) acknowledged that through visual texts, students gain new understanding, develop abstract and concrete reasoning, and think critically and express themselves through art.

Another teaching strategy that is indispensable to yield better results in teaching visual literacy to students in higher education is asking for message, purpose and intended audience of the image. Based on the responses of teachers and students, it can be viewed and understood that the learning skills and competencies related to visual literacy are also hierarchical in nature and organization. Lee and Kim, et al. (2018), Chen and Hu (2019), Park and Song (2017), Kintsch (2018), and Zhang and Wildemuth (2019) also posited these ideas that viewers make several thinking processes, like making inferences, to construct meaning of the texts.

Serafini (2010), Liu (2013), Cutajar (2020) and Matusiak (2020) similarly mentioned that students will also be able to describe who an image is meant for, look into how images send messages about gender, ethnicity, and other social and cultural categories, validate their interpretations and analyses of images by talking with others, and critically look at how persuasive or manipulative techniques may have been used in the making of an image to change how it is seen.

The third frequent teaching strategy used by teacher participants in their class is getting students' first impression. Allowing the students to state their impression of the visual materials or elements presented is also an opportunity to build connection between their prior knowledge and current perspectives about the visual text. Similarly, Locher (2015) and Jandhyala (2017) recognized the importance of eliciting students' impression of the visual texts because this contributes to the overall meaning of the texts, and it aids students to better comprehend visual texts since it stimulates their emotions.

Another effective strategy to involve them in meaning making is asking students' feelings. Visual literacy instruction draws strong cognitive and artistic support from emotional domains. Corollary to this, Tillmann (2012) explained that students' feelings about the visual texts help them to comprehend and communicate with images since these texts provide wide range of emotions.

The last strategy teachers employ to develop students' visual literacy is probing students' understanding about the image. Such strategy allows students to comprehend, ask questions, develop a sense of meaning making and make a stand from the message an image conveys. Rowsell et al. (2012), Haydn & Harris (2015) and Pickles (2010) believed that through the historical facts that are found in visual texts, students can be drawn into a dialogue and share personal meanings from the students that could be related to other issues.

Table 1b presents the Stage 2, the Lesson Proper or the Discussion in developing students' visual literacy based on the 22 statements of the teacher participants and the 19 statements from student participants which were extracted from the interviews. It reveals the strategies teacher participants employ based on the interviews conducted. These include identifying elements of visual texts and asking students to self- reflect and scaffold. It can be gleaned that 24% of the teacher participants asked their students to identify elements of visual texts, asked their students about the meaning of a visual text by looking closely to each element (15%), and asked students to share their ideas about the visual text (24%).

In asking students to reflect, teachers gave them reinforcement activity (10%) and asked them to probe their understanding (17%). In scaffolding, teachers asked students to interpret and analyze the visual texts and share them to the class (7%), and present the interpretation to the class, form groupings and formulate answers (3%). Asking students to identify visual elements and how they work together allows students to impact valuable contributions in terms of funds of knowledge, concepts and ideas during visual analytical activities and tasks.

Identifying visual elements and visuals provides for the foundation of the basics of visual literacy instruction. Recognizing visual clues is equal to the training of the students in interpreting the meanings represented by visual elements and texts. This is true of Karchmer-Klein and Shinas (2012), Abas (2019) and Mbelani (2013) who posited that it is significant for learners to identify visual elements, design their own visual texts, and convey information other than the use of words alone.

The second strategy in the Lesson Proper Stage is asking students to reflect. The teacher participants considered self-reflection as one of the reinforcement activities to develop students' visual literacy. McWilliams (2022) also emphasized the practice of introspection to be incorporated into art appreciation lessons as it allows learners to use creative visualization to map out their ideas. Scaffolding also becomes more effective when the concepts and meanings being shared by the groups are accurate, substantial, and meaningful that it contributes to the knowledge acquisition in visual literacy of their fellow learners. Callow (2005), Pantaleo

Table 1b Stage 2 of the Teaching Strategies to Develop Students' Visual Literacy

Themes	Sub-themes	Activities							Total
II. Lesson Proper- Discussion		**Teachers**	**F**	**%**	**Students**	**F**	**%**	**F**	**%**
Identifying elements of visual texts	Teacher asked students to identify elements.	Teachers asked the students to look into the elements of the visual text.	1	4%	On the students' perspectives, they were asked to give meaning to visual elements.	9	47%	10	24%
	Teachers asked them to identify how elements of visual texts work together.	Teachers asked students about the meaning of a visual text by looking closely to each element and their connections which serve as clue for its meaning.	6	27%	According to students, they were asked to identify the meaning of the text using its elements.			6	15%
	Teachers asked them to share their thoughts/opinions	Teachers asked students to share their ideas about the visual text.	3	14%	Students were asked to share their ideas as to the meaning of visual texts	7	37%	10	24%
Asking students to self-reflect	Teachers gave reinforcement activity or assignment	Teachers gave activities that reinforce the knowledge and skills of students.	2	9%	Students accounted that they were given activities to reinforce their learning.	2	11%	4	10%
	Teachers asked them to self-reflect.	Teachers probe students' understanding about the context of the visual text.	7	32%				7	17%
Scaffolding (Teacher uses reinforcement activity)	• Teachers asked them to interpret and analyze visual texts. • Teachers asked them to present their understanding through group presentation.	Teachers gave tasks of interpretation by group and asked to share their analysis to the class.	3	14%				3	7%
	• Teachers asked them to use pictures, form groupings, and formulate answer.				On the students' perspectives, they brainstorm to make meaning to visual texts.	1	5%	1	3%
TOTAL			22	100%		19	100%	41	100%

(2018), Botha et al. (2019) and Vie and Dieterle (2016) similarly stressed the importance of teacher's strategy and student's interpretive strategy developed through support and scaffolding and opportunities.

Table 1c on the next page presents the third stage, Assessment Phase, which includes the following strategies frequently used by teachers in developing students' visual literacy based on the 13 statements of teacher participants and the 7 statements from the student participants which were extracted from the interviews. These are collaborative task (35%), followed by writing task (25%), while peer assessment and question and answer both have (20%).

Asking students to work in groups is an effective way to allow them to assess the visual texts that they interpret. Based on the responses of teachers and students, it can be gleaned that the concept of collaboration in visual literacy instruction is not just limited to collective endeavor among students or merely by group works. This is because in visual literacy, the context of collaboration can also be viewed in terms of the interaction of students to the environment and the visual elements found in it. Likewise, Lasley et al. (2016), Chen and Chen (2019), Wang and Vásquez (2018), Shiel and McDonald (2019), Lee (2017), and Dezuanni and Beavis (2019) asserted that it is important for students to work collaboratively when obtaining and organizing information and interpreting and manipulating a set of ideas to comprehend and identify relevant data.

Table 1c **Stage 3 of the Teaching Strategies to Develop Students' Visual Literacy**

Themes	**Activities**						**Total**	
III Assessment Phase	**Teachers**	**F**	**%**	**Students**	**F**	**%**	**F**	**%**
Asking students to work in groups	Teachers asked students to group themselves and gave differentiated task.	7	54%				7	35%
Asking students to do writing activities	Teachers asked them to interpret visual texts in written form.	3	23%	Students were given various writing tasks to students which help them understand the visual texts better.	2	29%	5	25%
Asking students to assess their peer's works	Teachers asked them to assess their peer's visual interpretation.	2	15%	Students were encouraged to practice peer assessment where they rate and give comments to their classmates' work.	2	29%	4	20%
Asking students questions	Teachers provide them with questions.	1	8%	Students were provided guided questions for students to make meaning from visual texts.	3	42%	4	20%
TOTAL		13	100%		7	100%	20	100%

The second strategy teachers employed in assessing students' visual interpretation is asking students to do writing activities. The findings are similar to Moses and Mohamad (2019), Abdullah (2019), and Samosa et al. (2021) who posited that students' visual literacy can be developed through written activities.

Another teaching strategy in the assessment phase that teachers employ in developing students' visual literacy is asking students to assess their peer's works. In visual literacy instruction, the assessment process is not just intended for evaluative purposes. Moreover, peer assessment also serves as a potential visual literacy training for the students as they get to critically assess and analyze both their own visual works and their peers' visual presentation, which is equal to more ample sources of visual literacy knowledge. This is also true of Li and Lehman (2020), Ponce and Mayer (2014), Kistler (2014), Rosenthal and Kistler (2015), and Thompson (2012) who all claimed that peer collaboration even during assessment develops students' visual literacy.

Conclusion

Based on the key results and findings, the researcher has come up with the following conclusions: The teachers' subject for this study focused more on the literal meaning of the visual text; thus, they employed a limited number of teaching strategies that will aid the continuous development of visual literacy in the classroom. This means that teaching strategies have a big impact on how students interpret what they see, and that the stages of aesthetic development can only be reached if teachers have the knowledge and skills to teach visual literacy.

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INNOVATIVE SCHOOL EXPERIMENTS

Didactics In Public High Schools In Madagascar

Régina Liziane ZAFIARISOA and Pr. Jean Claude Omer ANDRIANARIMANANA

Abstract

To be an English language teacher, one needs several competencies and amongst these, we have decided in this article to inquire about didactics in high schools in Madagascar. Within the last decades, teaching practices have evolved. What are the English Language Teaching practices and teaching difficulties in public high schools in Madagascar? Are Malagasy teachers using teaching and learning skills related to 21st century teaching and learning skills? In this article we will discuss the state of the teaching and learning of English in public high schools in Madagascar through the analysis of the results of the questionnaires that we distributed to 63 teachers of Malagasy public high schools. We used IBM SPSS 21 software for data processing. Our goals are to be able to identify the different didactic issues related to the teaching of English in Madagascar while suggesting to introduce new skills for the teaching and learning of English in the 21st century. Amongst these skills, we have singled out 5Cs: Communicative skills, Critical thinking, Collaboration, Creativity and imagination and last but not least Culture. In our era, 21st century skills are closely linked to technology so we have also devoted some research on the latter. The work would benefit the in-service teachers and specifically the pre-service teachers of public high schools at the 'Ecole Normale Supérieure', University of Antananarivo.

Keywords: Malagasy Teachers, English Teaching, 21st Century Skills.

Introduction

A few days before her high school internship, a novice teacher is anxious about how her English class will go, and 'what if I couldn't answer my students' questions? What are the best strategies to adopt for teaching grammar… ? And what about language skills? In particular listening? Should I correct all my students' errors and how should I evaluate them? What kind of teaching aids can I use…? What are the best strategies to adopt?'. Indeed, several skills are necessary if you want to be a language teacher. In this article, we will focus on the teaching of English as a foreign language (Teaching English as a Foreign Language or TEFL) in high schools in Madagascar. As part of our research on linguistics competencies and English Language Teaching competencies, we shared questionnaires with teachers serving in public high schools in Madagascar in order to inform us of the current practices and difficulties. Our objectives are to know the didactic practices that are used in our high schools, and to discuss the difficulties that our teachers face so that our apprentice teachers can learn, adapt and above all improve their teaching skills by anticipating the challenges. The information from our questionnaire allows to adjust the content of the initial curriculum of the English teacher training department within the "Ecole Normale Supérieure of Antantanarivo", a state teacher-training school.

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Methods

Our questionnaire concerns 65 school English teachers from different regions of Madagascar. To process the results, we used the IBM SPSS 21 statistical software. Indeed, in addition to the discursive analysis for a qualitative study, the processing of the data also allowed us to obtain quantitative data.

Results

Communicative Skills

Our result shows that in-service teachers still have difficulty teaching language skills or communicative skills, particularly Listening and Reading skills. Xhuvani (2015) says that teachers must set high standards for an English classroom (…). They must strive to create the necessary conditions for students to learn effectively and achieve the desired outcome. For English teaching to be successful, the four skills, Reading, Listening, Speaking and Writing, must be integrated effectively. These skills should be approached in a way that help students achieve the standards you (teacher) set for them and gradually develop their communicative competence. Among the 61 teachers surveyed, 30 teachers claimed to have difficulty teaching Listening compréhension, 14 assumed to have difficulties in teaching Reading, while 12 aknowledged to have difficulty in teaching oral production and 5 found Writing as the most difficult skill to teach. In a communication situation, these four skills are linked and it is difficult to treat them separately; they are, most of the time, intertwined and integrated even if there are theories on each of them. Teaching materials and teaching resources may partly be one reason for the difficulties, but teaching strategies also play an important role. English is based on "communication", which is one of the main axes of 21st century skills, and therefore, the four language skills are meant to be developed effectively. Through the survey, we discovered that 49.2% of the respondents do not know the concept **'pre-while-post stages'** or **'Before-during and after stages'** while the other 49.2% declared to have a notion of the concept. This strategy is applied when teaching language skills.

Table 1 **'Pre-While-Post-stages'or 'Before-During and After'stages**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I know this concept	31	49.2	50.0	50.0
	I do not know this concept	31	49.2	50.0	100.0
	Total	62	98.4	100.0	
Missing	System	1	1.6		
Total		63	100		

Teaching Materials and Authentic Materials

Books, magazines, audio or video recordings and other teaching materials often offer a variety of activities to enable the practice of the four communicative skills, but do Malagasy teachers have these teaching materials and resources in their establishment? The opinion is mixed : half of the respondents use textbooks, and the other half do not use textbooks, 29 teachers out of 63 encourage their students to read magazines or novels. Learners are invited to really immerse in the target culture and language through authentic materials. It turns out that 62.9% of teachers know what authentic material is, while 36.5% have no idea what authentic

material is. Concerning the frequency of use, 3.2% have never used authentic materials, 15.9% have done so but rarely while 23.8% use authentic materials when they teach; 6.3% do it regularly and 9.5% use authentic materials at each session.

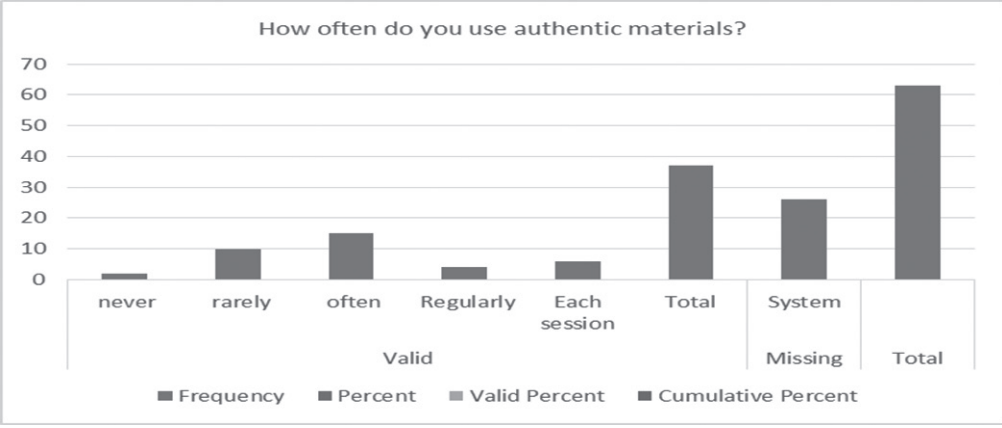

Figure 1: Authentic Materials Frequency of Use

From our observation, high school Malagasy teachers produce or mainly create their own texts and dialogues, as well as crafts, drawings and grammar tests or exercises. Teachers expressed their dissatisfaction (63.5% of respondents) regarding the infrastructure and available resources for language teaching in their establishment.

On the other hand, teachers often feel stressed and helpless in the face of the high number of learners in public high schools. Indeed, according to 77.8% of the teachers surveyed, large classes are difficult to manage.

Table 2 Teachers Having Difficulty Managing Large Classes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I have issues managing large classes	49	77.8	77.8	77.8
	I have no issues managing large classes	14	22.2	22.2	100.0
	Total	63	100.0	100.0	

Critical Thinking

Students show reluctance when expressing their opinions. Critical thinking offers an opportunity to question and work on facts and opinions, observation and analysis to have better logic and problem-solving ability. It turns out that 4.8% of teachers have never tried to integrate critical thinking into their teaching, 15.9% have rarely done so, 23.8% often do so, while 14. 3% include critical thinking in their activities, and 12.7% include it in every session. Only one teacher out of 63 uses problem solving in each session. The majority of teachers rarely use problem solving, for instance 11.1% have never tried this strategy while 15.9% often do so.

Collaborative Strategy

In our result, 50.8% of respondents to our questionnaire claim to know this strategy while 46.6% of them do not know it, 3.2% have no opinion.

Figure 2: Teacher's Knowledge of the Term 'Collaborative learning'

Collaborative learning was never used by 4.8% of respondents, 15.9% rarely use it in class, while 22.2% often use this technique, while 6.3% use it regularly, and 3.2% use it at each session.

Creativity and Imagination

To help learners develop critical thinking and problem solving, and to allow everyone to express their intelligence in their singularity, creativity is a necessary ingredient in the classroom. Indeed, our result seems to confirm that creativity is not often highlighted in our classes, because only 7.9% use it in each session, 7.9 use it regularly while 15.9% often use it and that 12.7% rarely do so while 6.3% almost never resort to creativity and imagination during their English lessons.

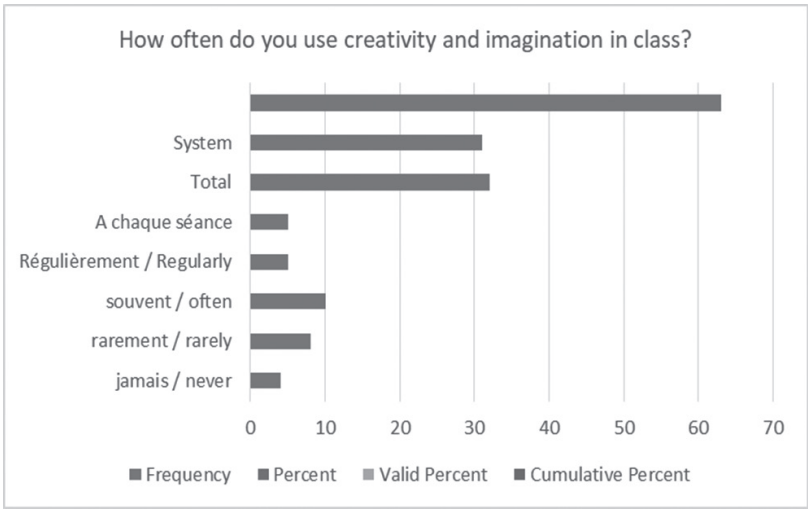

Figure 3: Creativity and Imagination

Culture

Culture is, according to the Resource Center for teaching American English 'American English for Educators,' culture embedded the 'way of life of a group of people illustrated by their behavior, habits, attitudes and values'. From the questionnaire, one respondent out of 63 does not include culture in their teaching of English, while four out of 63 do so in each session. However, it is noted that 28.6% of them rarely consider culture during their course even if 11.1% often do it and 9.5% do it regularly.

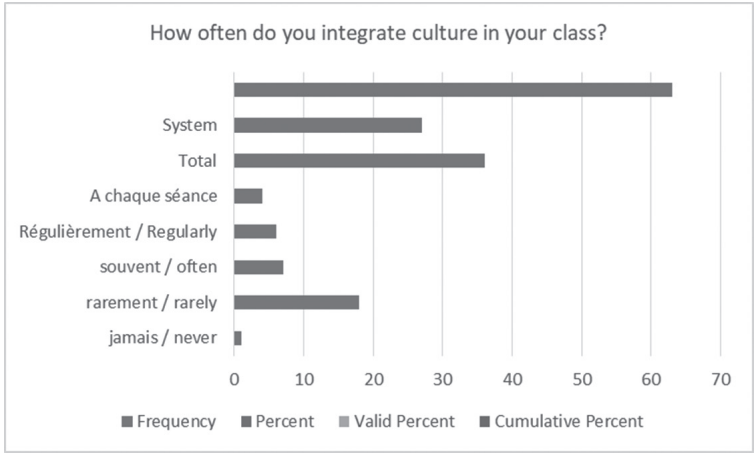

Figure 4: Integration of Culture in English Classes.

Technologies for Teaching English Language

In the era of the 21st century, the facilitation of learning through technology or "digital learning" is highlighted in education. In our opinin, in France as in England and the United States, new technologies are an integral part of the teaching of a language in the 21st century, particularly English. It is no wonder that young people are watching videos and are learning from their phones or downloading entertainment from cybers. Are Malagasy teachers taking advantages of this situation? Among respondents, 65.1% do not yet know what "digital learning" is, while 33.3% do.

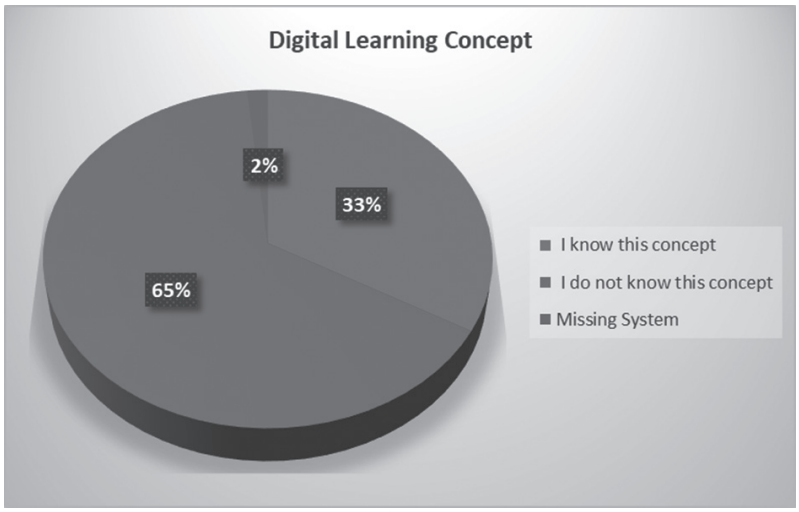

Figure 5: Do Teachers' Know What Digital Learning Is?

Using podcasts or Websites also help with lessons or teaching resources, the survey reveals that the majority of teachers, 55.6% of the respondents never resort to language websites for their teaching, however, 42.9% of respondents visit a website to obtain resources or to acquire new techniques in order to improve the quality of teaching/learning of the English language.

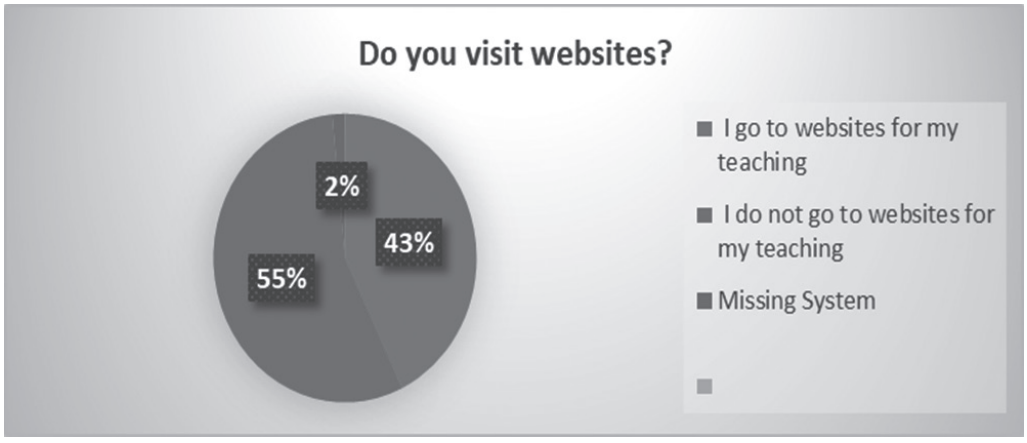

Figure 6: Do Teachers Visit Websites for their Teaching ?

Discussion

Constraints

Optimal conditions are difficult to achieve since the rooms are in poor condition and the benches and chairs are difficult to move not only because they are large but also because there are so many of them (considering that a 9m2 room for example accommodates at least fifty students). According to Dhalluin (2012), numerous studies reveal that in France, as everywhere in the world, the quality of ventilation in school buildings is poor, which is all the more worrying given that the population concerned is among the most fragile. Air renewal rates are generally too low due to unsuitable, poorly sized or simply absent systems, which very often give rise to problems with indoor air quality (IAQ) and thermal comfort in particular, responsible for many health problems and the decline in student performance. Apart from the need for natural comfort, the difficulties lie on the mobility of the teacher, the limitation of choice of activities and the possibility of the learner to create freedom to approach one another to exchange and share or even collaborate as in a real-life situation is merely impossible. Respondents to our questionnaire, for example, noted that the lack of electricity penalises teachers and students, who must do regular listening activities to acquire language skills. Calling on technology seems a euphemism since, for example, even if the digital tablets have been distributed by the Ministry, there is neither electricity nor network available. During a conversation with Serge, a teacher in the depths of Vavatenina, in the Eastern part of the island, tells us that he has to travel more than 50 km to reach a nearby village in order to be able to connect and having the time and money often poses problems for him. His phone has poor reception of networks and therefore it is also difficult for him to chat with colleagues. The majority of teachers specifically consult the American government website entitled “americanenglish@state.gov” since most of them received training from the American Embassy in Madagascar in 2021-2022. To conclude, the conditions for achieving the objectives set by the Official High School Program are not met. Teachers must be helped in order for them to be effective and efficient, otherwise as Doff (1987)

says, the teaching of English has all the characteristics of teaching in difficult circumstances, as if we were facing endless periods of war or famine or natural disaster all the time, and perhaps this is how ultimately teachers need to be trained but not (in Doff's idea) to be based on Anglo-Saxon and European models which work in privileged conditions. All their hypotheses are non-compliant, once we leave the Anglo-Saxon and European contexts. This, according to him, entails reviewing the entire content of training materials, methods in general, and the very education of teachers. Our perception is that taking into account our culture and reality is a must when we teach and when we train our teachers, while knowing what is best practice in these contexts and adapting a practice or some of them because as we say so well in our language "andrianiko ny teniko ny an'ny hafa koa feheziko" (free translation: I value my language and I master those of others), we can do the same with resources we have and teaching methods.

Learner-centered Approach

The learner can learn without the teacher while the teacher cannot teach without the learner ; thus, a learner-centered approach is highly encouraged. It is up to the teacher to find the appropriate content, methods and techniques that can help learners to not only acquire knowledge but also transform knowledge into skills. Robbes (2019) understands by competence the "ability to operationalize knowledge in practice, that is to say, not to mobilize knowledge in itself but to articulate formalized knowledge, as well as other cognitive and affective resources, to be able to act and re-act in a situation. Learners needs more opportunity to practice, to show that they have learned, that they have made a mistake or simply to realize their progress. We invite teachers to have a community of practice and to participate, even more, in different events in English and involve their students in different projects because "the teacher is often seen as the centerpiece of quality teaching, the linchpin in the acquisition of students' skills", (Diane Cour and Nelly Rakoto Tiana, 2010) but also their motivation. In class, the "modeling" technique can be of great help to students who are not really sure of themselves. Coleman (2020) explains that "modeling is an extremely useful educational tool that should be used as often as possible. Modeling is a teaching strategy in which a teacher explicitly shows students how to complete an activity or assignment before the students begin. Modeling is also an excellent classroom management technique. He says it eliminates frustration, anxiety and confusion. It can be used with the four language skills but also with communicative grammar and pronunciation, language function... but also for classroom routines or creative activities where the teacher participates with the students. For his part, Brown (2014, p.235) reminds us that the communicative approach, known as "Communicative Language Teaching or CLT", undoubtedly has been for three decades, the approach that offers strategies for different ages and to achieve various objectives. It gives four characteristics which are interconnected:

1. Class objectives focus on all components of classroom communication and are not limited to grammatical or linguistic competence.

2. Language techniques are designed to engage the learner in the pragmatic, authentic, and functional use of language for meaningful purposes. Organizational language forms are not the central goal, but rather aspects of language that enable the learner to achieve these goals.

3. Fluency and accuracy are considered complementary principles underlying communication techniques. Sometimes fluency may be more important than accuracy in order to keep learners meaningfully engaged in language use.

4. In a communicative classroom, students must ultimately use language, productively and receptively, in non-rehearsed contexts.

However, it is also essential to know our students, the way they learn, we suggest that teachers do not focus only on teaching strategies but also on learning strategies because we have noted that this aspect is still poorly exploited in our Malagasy context.

Large Class Management

Like many countries in Africa, Madagascar has embarked on the policy of Education for All and has therefore increased the number of students in classrooms. Pare Cabore and Gambre-Idanynd (2014) explain that "one of the consequences of this overcrowding in classes is obviously the slowdown, or even the obstacle to the smooth running of educational activities. The concern that drives both researchers and education practitioners is to find an educational solution to this problem, because as the contemporary educator Célestin Freinet said so well, " (…) any overcrowding of classes is always a pedagogic error. Large classes often cause disciplinary problems, corrections are difficult to handle," it is also difficult to interest or involve each student. Gambré-Idany (2012) observed in a study that for English teachers in Burkina Faso, large classes are an obstacle to communicative approach or CLT. Furthermore, "assessment in large groups would be very difficult to carry out, so they settle for a limited number of assessments and favor types of questions that are easy to correct such as multiple-choice questions (MCQ), dichotomous questions, true or false questions as well as matching questions. Open questions or those which require opinion are reduced to the strict minimum, or even avoided so as not to overload the teacher with corrections." However, it is precisely this last category of questions that most develops the critical and analytical spirit of learners and, in turn, promotes the learning process (Shohamy, 1992). These issues have certainly some solutions. Firstly, among the most used learning strategy is Collaborative Learning. Indeed, sharing knowledge among learners promotes success and is a source of motivation. In the acquisition of skills for 21st century, researchers and educators encourage collaboration, cooperation, sharing and exchange between learners, see more at americanenglish.state.gov. Regarding assessment, learners can be very good companions if they are aware of what is being asked and why. It is also possible to draw up competency evaluation grids or rubrics with them for regular monitoring. Students can self-assess without the teacher intervening. Doff (1987) emphasises that "positive large class methodologies (…) such as peer working, and questioning techniques, (…) can all be specifically designed to be used in large classes with minimal resources and are quite different from equivalent small class methodologies." Ur (1996) provides more precision on the need to use the advantages of large classes, as in case there are many students, they have several life experiences and different knowledge, various opinions, different forms of intelligence-which enriches teaching and learning. Over the last two years, the American English Training of trainers or AETOT project led by the American Embassy in Madagascar senzitizes teachers to use some of the strategies above. Pare Cabore and Ambre-Idany (2014) affirm that "despite (the) training, many teachers in the field still have difficulty handling large groups (…). Nowadays, the admission of volunteer teachers (without basic training in the teaching profession) into primary education classes can only make the situation worse. Let us also point out that the problem of teachers without professional qualifications is not specific only to basic education, because secondary education has always had its "auxiliary" teachers (without specific training in the subject) that the State, faced to the lack of teachers in secondary education, recruits and sends directly to

middle and high schools without prior educational training. Considering the profile of these teachers, it is necessary to provide them with know-how to better manage large groups."

21st Century Teaching Skills

In the 21st century, lifestyles, jobs and careers have evolved. The teacher must manage and adapt to all these changes and integrate new skills into students so that later they can meet the needs of the working world and also be efficient economic actors. Teaching has reached a turning point, where the question is not to overwhelm the student with a quantity of information that will not be useful to them later, but to concentrate on them, their knowledge, know how, in order for them to act as a "whole". They are required to use critical thinking to solve problems, create and innovate through good communication skills and have the ability to collaborate, working as a team to find practical solutions to problems. As Christian Puren (2001) explains, the term "new" does not mean to say that all other approaches and strategies should be forgotten or replaced but rather added to what exist. Our research leads to the conclusion that these strategies, which are the pillars of the skills required for the 21st century, are not yet mastered in our establishments. The reason is simple, either the teacher does not know these strategies, hence the need to integrate their techniques into teacher training or teachers know them but are not convinced of their effectiveness.

Integrating New Technologies

As trainings about Chat GPT, Artificial Intelligence and online teaching and learning are now the trends, for most Malagasy teachers, access to internet, the use of CDs and other audio-visual materials, podcasts and websites, computer softwares are still arduous. More trainings on how to integrate technologies and the importance of integrating technologies in English Language teaching are now a challenge for Malagasy Teacher Trainers and that is one of the unit or module that must be included in the curriculum for English Language Teacher-Training Schools in Madagascar.

Conclusion

Malagasy teachers still use traditional approaches and strategies. Teaching and learning skills related to the 21st century skills are not well-exploited and even not known. Herrel and Jordan (2020, 2016, 2012, p. 9) quote Cummins (2000) who highlights the power of academic language in promoting the success of English learners, in school and in life. Pre-service English language teachers must be aware of these issues in order to be able to effectively tackle their task as English language teachers. To be efficient and effective, teachers should learn to be resilient when teaching, as Vilchez and Sucari (2021) explain, teacher resilience is understood as the capacity, process, and management of positive qualities and abilities that encompass the emotional, motivational, and social dimensions of the teacher.

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Analyzing the Influence of Calculator Statistical Features on Grade 11 Students' Statistics Performance

Reynan H. Olquin, MST

Abstract

The research entitled "Analyzing the Influence of Calculator Statistical Features on Grade 11 Students' Statistics Performance". The different scientific calculators were used in the control group which are commonly used in every class statistics. The statistical features of the graphing calculator were used in the control group. This study aims to determine the effects of statistical features of calculators on students' performance in grade 11 statistics. Specifically, the study sought to answer the following questions: Is there a significant difference between the pre-test of the Control and Experimental groups? Is there a significant difference between the pretest and posttest of the Control and Experimental groups? Is there a significant difference between the gain score of the control group and the experimental group? And, give a general observation of the study. The result of the study shows that there is a significant difference between the use of the different statistical functions of calculators. The experimental group showed better performance and easily used the statistical features of graphing calculators. In the Control group, students had difficulties in solving the z-test, and p-value. The statistical feature of graphing calculators is useful in higher topics in statistics.

Keywords: Graphing Calculator, Statistics, Experimental, Control, Students, Features

Introduction

Many forms of technology around the world gained the interest of teachers and learners. Educators use technology to enrich their potential and ability in teaching. For many years, the use of calculators in the classroom has been debated by parents, students, and teachers. However, people realized the significant role of calculators in complex and complicated problem-solving. And, this idea is supported by Common Core Standards for Mathematics Practice (SMP).

The functions of statistical features of the graphing calculator help make the computations less tedious and allow the use of real data. A less common and reporting detail is with the test performance and score. Some studies show students' improvement with the use of some functions of calculators (Carlson,1996).

Graphing calculators offer a suite of statistical features that play a pivotal role in shaping students' performance in subjects like Statistics, Science, and Mathematics. One of the most impactful capabilities is data visualization, allowing students to graphically represent datasets. This visual representation aids in the interpretation of statistical patterns, making it easier for students to discern trends and outliers. Additionally, features such as regression analysis empower students to model real-world scenarios, enhancing their ability to apply statistical principles in practical contexts. The calculators' support for hypothesis-testing and probability distributions further deepen students' understanding of inferential statistics, enabling them to

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make informed decisions based on rigorous analysis. The dynamic data entry and analysis functions foster active engagement, allowing students to manipulate datasets in real-time and gain a nuanced understanding of how variables influence statistical outcomes. The calculators' comprehensive statistical functions simplify complex calculations, reducing computational errors and enhancing the efficiency of statistical analysis.

The Department of Education, under its jurisdiction, has provided public schools with Senior High School (SHS) programs and graphing calculators to make a difference in the pedagogy of teaching Statistics to SHS students. The evolution of this tool is a leap in the advancement of solving statistical problems. Concerning this, the Department of Education conducted a 4-day national seminar in October (2019) in Cebu City for Grade 11 Senior High School teachers on the use of graphing calculators. Teachers were given the chance to manipulate the different functions of the graphing calculators. One of the main lessons presented was the use of the Statistical Function in hypothesis-testing which is a skill to be developed for Grade 11 students.

In the 21st Century, teaching and learning must cope with the demands of the encroachment of graphing technologies. It is for this reason that in the SHS Curriculum, technology is used as an aid for the teaching and learning process. The graphing calculator is a graphing teaching aid for statistics (Kemp, Kissane, & Bradley, 1998).

Objectives of the Study

This study was conducted to determine the effects of statistical features of calculators. The control group used scientific calculators, while the experimental group used a statistical feature of graphing calculators.

Specifically, it aimed to:

1. Determine if there was a significant difference between the pretest of the control and experimental group,
2. Determine if there was a significant difference between the pretest and posttest scores of the control group and experimental group,
3. Determine if there was a significant difference between the gain score of the control and experimental group.
4. Give a general observation of the study.

Review of Related Literature

Calculators on Students' Achievement in Statistics

According to Jones (1996), using a calculator in Mathematics and Statistics can minimize tiring procedures, so that students concentrate on the concept, develop higher-order thinking skills, and learn relevant applications. A powerful calculator helps students as another resource for cognitive sense and estimation skills and guides them by following procedures necessary to understanding mathematics and other subjects. One significant challenge in the performance of students in statistics arises when they lack access to or proficiency in utilizing the advanced statistical features of calculators. Without the support of these technological tools, students may encounter difficulties in handling complex statistical computations and analyses.

With the use of the graphing calculator, students will no longer develop anxiety in problem-solving (Jones, 1996). They will be guided with their computations on multiplication and other operations and will come up with the right answers. The teacher should still teach the students to enhance better mental estimation ability so that they will realize that the calculator makes sense in a problem situation which allows students to focus on the steps involved in problem-solving.

Graphing calculators help students to use true data in the problem. It helps students to answer quickly between the symbolic representation and tabular representation of data and gives a lot of opportunities to solve how each representation contributes to analyzing the data. Calculator makes statistics subjects and statistical reasoning affordable to all learners. Through this, learners will break down the data, compare the results to expected results, describe a model, and make it possible without a calculator.

To improve the students' performance and their level of metacognitive awareness while solving problems, calculators can be used. Integrating calculators can pose an instructional mode and learners can make explicit steps of solutions while doing the activity. It can elicit appropriate cognitive processes to the relevant schema of construction. Students can have better conceptual knowledge with the use of a calculator (Alin, Tajudin, and Konting, 2007).

Methodology

Research Design

The The quasi-experimental method of research was used to determine the use of calculator statistical functions in hypothesis-testing on the performance of Grade 11 students.

Research Instrument

The instrument used was a statistics performance test designed to assess the students achievement in statistics. The tool was constructed and adopted from Grade 11 statistics books and other resources. The tool contained 15 multiple-choice problems on hypothesis-testing.

Sampling Method

The experimental group, consisting of 50 Grade 11 General Academic students, exclusively utilized the Run-Math and STAT functions of the graphing calculator to address z-test, t-test, and regression/correlation problems within the realm of hypothesis-testing. Complementing this technological approach, the students also referenced t-tables and z-tables provided by the teacher. The graphing calculator's statistical functions proved instrumental in efficiently solving complex statistical analyses, covering z-test, t-test, and p-value calculations.

The control group, comprising 47 Grade 11 students specializing in Humanities and Social Sciences, formed a distinct section in the research. Employing scientific calculators, this group tackled z-tests, t-tests, and regression/correlation analysis as part of their hypothesis-testing procedures. Notably, the scientific calculators utilized by the control group demonstrated proficiency in resolving correlation and regression analysis; however, they could not calculate z-values, t-values, and p-values.

Data Gathering Procedure

Before the pretest, the researcher explained the purpose of the research in both groups. Then, the pretest was administered to both groups in the first session of the class. The groups answered the pretest using the calculator, z-table, and t-table within 45 minutes. On the posttest, the experimental group used the Run-Math and Statistical functions of the graphing calculator. They were also allowed to use a z-table and a t-table. The control group used a scientific calculator, t-table, and z-table. Both groups answered within 45 minutes.

Method of Data Analysis

The research study was quantitative. The data gathered were analyzed and interpreted using the t-test for the difference of two means and measured the difference between the experimental and control groups.

Results and Discussion

Table 1 Difference between the pre-test of the Control group and the Experimental group

Group	Mean	SD	Computed t	p-value	Conclusion
Contro	3	1.27	-1.05	.2973	Not Significant
Experimental	3.4	1.57			

Table 1 shows that the p-value is greater than 0.05 which means that the performance of the two groups during the pretest has no significant difference. Both groups used the scientific calculator during the test and were given 45 minutes to answer the test which simply shows that both groups manifested an equivalent level of understanding on the given hypothesis testing.

Table 2 Difference between the pre-test and post-test of the Control and Experimental group

	Pre-test		Post-test				
Group	Mean	SD	Mean	SD	Computed t	p-value	Conclusion
Control	3	1.27	7.78	1.73	-11.52	0.00001	Significant
Experimental	3.4	1.57	9.8	1.81	-14.65	0.00001	Significant

Table 2 shows the significant improvement in the performance of the experimental group and Control group during the post-test. The experimental group increased the mean from 3.4 to 9.8 with the aid of the statistical function and Run-Math of the graphing calculator. The statistical function of the graphing calculator in statistics avoids long procedures in which students can easily focus on the problem. During the posttest, all students of the experimental group answered 50% above on the given test items which proves the better impact of the graphing calculator on their performance. During the pretest, the respondents answered the problems for more than 30 minutes; during the posttest, some of the students answered the items for less than 25 minutes. This shows how the respondents quickly solved the given problems with the aid of the graphing calculator which gives ample amount of time for the respondents to review their answers. The features of

more graphing calculators can develop the statistical analysis beyond the level and capacity of learners. Gorman (2008) said that the calculator helps the students to be more interactive and can perform better.

In contrast, the control group showed significant improvement in performance during the posttest in which 86% of the students of the control group answered the given test items. The result of the test showed students' improvement after the discussion and introduction of statistical features of the scientific calculator. The mean score increased from 3 to 7.8. On the pretest, students answered the test in 20 minutes; on the posttest, they answered the test in 45 minutes which needed to be solved showing the long process of solutions. On the contrary, the non-honor students answered the test in 30 minutes since they were not into long process problem-solving. However, the result shows that there is a significant difference between the pretest and posttest of the control group.

Table 3 Difference between the gain score of the Control group and the Experimental group

	N	Mean	SD	Computed t	p-value	Conclusion
Control	27	7.78	1.73	-4.29	0.000072	Significant
Experimental	30	9.8	1.81			

Table 3 shows the p-value which is less than 0.05. It was concluded that there was a significant difference between the performance of the control group and the experimental group. The experimental group shows better performance than the control group as they show a higher mean. The students in the experiment answered the test in less time with short solutions. Less time because the statistical features graphing calculator can solve the problem directly and have more graphing features which implies that the long process involved in statistical problems is no longer an issue for the students. The statistical features of the graphing calculator can solve higher statistical problems while the control group needs to solve some of the long process solutions to get the answer which demands an ample amount of time and formulas to solve statistical problems.

Researchers' General Observation

The researchers observed during the conduct of the study the difference between the use of the scientific calculator of the control group and the statistical features of the graphing calculator of the experimental group in teaching Grade 11 Statistics. When in the control group, the students had difficulties in the long process of problem-solving. On the topic that needs a long process solution, the researchers needed to teach the control group the step-by-step solution which consumed too much time in the discussion of the problem in finding the needed values. In addition to that, students were also raising more questions on what keys to press in the calculator which made it more tedious because it needed a one-on-one tutorial on how the calculator is to be manipulated. The scientific calculator is not that powerful to solve statistical problems directly. While in the experimental group, when the researcher introduced the long process solution in solving the statistical problems, the respondents got bored and tired since it was the last period of the afternoon. However, when they were introduced to the advantage of using the calculator in solving the statistical problems, the respondents showed interest. The topics in hypothesis-testing became easy to teach as the respondents were focused and

they appreciated the importance of the calculator in problem-solving. The statistical features of the graphing calculator are useful in graphing Statistical topics such as p-value, f-test, Chi-square, and ANOVA.

There are varied strategies employed in teaching the two groups, using graphing and scientific calculators. In the control group, there is difficulty in using the statistical features of the scientific calculator since there are complicated keys to press and the features of the said calculator are not so powerful to solve higher statistical problems. On the contrary, the experimental group showed no difficulties, using the graphing calculators with graphing statistical features such as solving the t-test, z-test, p-value, chi-square, ANOVA, and F-test.

Conclusion and Recommendations

Conclusion

In the 6-week conduct of research, tests revealed that there is a significant difference between the use of the scientific calculator of the control group and the statistical features of the graphing calculator of the experimental group. In the Control group discussion, students had difficulties in solving the z-test, and p-value. The statistical features of the scientific calculator are limited to some topics only. Students had solved the long process solutions but the group showed a better performance.

Students were more interactive in the class discussion. In teaching statistics, there is a significant difference in the performance of both groups. This result implies that the statistical features of graphing calculators have the advantage of solving statistical problems without consuming too much time. With these, the students are more motivated to participate in the class discussion. The incorporation of graphing calculators into statistics education has yielded notable advantages, fostering increased student interaction in class discussions and demonstrating a significant disparity in performance between groups. Graphing calculators, with their multifunctional capabilities, prove instrumental in efficiently solving statistical problems while simultaneously promoting a more engaging learning atmosphere. These calculators empower students to visualize statistical concepts through graphical representations, enabling a more intuitive comprehension of data patterns and relationships. This visual approach not only enhances problem-solving skills but also encourages collaborative exploration during class discussions, as students can readily share and analyze graphical outputs. Lastly, the use of graphing calculators contributes not only to improved academic performance but also to the development of a more interactive and visually oriented statistics education.

Recommendation

Based on the results of the research, the researcher recommended that the students' skills in manipulating graphing calculators must be given attention in the fields of Statistics, Science, and Mathematics. Teachers in the fields of Statistics, Science, and Mathematics must incorporate various technologies during classroom discussions such as the DepEd-issued graphing calculators. And, supplementary study on the use of graphing calculators with a greater number of respondents must be conducted to further validate the findings of the study. To further strengthen the validity of the research findings, a call for continuous research and evaluation is paramount. Initiating supplementary studies with larger and more diverse respondent groups will contribute to the robustness of the evidence supporting the positive impact of graphing calculators.

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LEVEL OF ACHIEVEMENT QUESTIONNAIRE

Name: _____

Score:_____

DIRECTION: CHOOSE THE CORRECT ANSWER

1. The owner of the factory that sells a particular bottled fruit juice that the average capacity of their product is 250ml. to test the claim, a consumer group gets a sample of 100 such bottles, calculates the capacity of each bottle, and then finds the mean capacity to be 248 ml. The standard deviation s is 5 ml. Is the claim true?

   a. Yes, because the z-value of -4 is less than the t-value of -.1.545
   b. Yes, because the z-value of -7 is less than the t-value of -1.545
   c. No, because the z-value of 4 is greater than the t-value of 1.545
   d. No, because the z-value of 7 is greater than the t-value of 1.545

For 2-3 table

A teacher wanted to test whether the total score in the student's optional assignment in Probability Answer Statistics affects the Final Grade of the students in the same subject. The teacher randomly selects 10 students and records them in the table below:

Total Scores in Optional Assignments(X)	125	85	130	90	50	65	80	150	16	120
Final Grade in Probability and Statistics (y)	90	89	90	91	82	85	89	93	70	89

2. What is the computed correlation?

   a. 0.8640 b. 0.8639 c. 0.8642 d. 0.8641

3. If 55 optional assignment items were done by the student, what would be the student's final grade in statistics and probability?

   a. 83.71 b. 82.71 c. 81.71 d. None of the above

4. A sample of five measurements, randomly selected from an approximately normally distributed population, resulting in the summary statistics: sample mean = 4.6, s = 1.5, and . Solve the test statistics.

   a. -2.23 b. 2.092 c. -1.092 d. 1.092

5. A random sample of 200 school managers was administered a developed Leadership Skills Test. The sample mean and the standard deviation were 78 and 4.2, respectively. In the standardization of the test, the mean was 73 and the standard deviation was 8. Compute the z-statistics.

   a. 8.77 b. 7.87 c. 7.98 d. 8.88

6. The following data shows several absences and the number of quizzes missed by five students. Compare the computed t-value to the critical t-value with 0.05.

Number of Absences	1	1	2	3	4
Number of Missed Quizzes	1	2	4	2	4

   a. Computed t = 1.30 less than the critical t = 3.182
   b. Computed t = 1.003 less than the critical t = 2.182
   c. Computed t = 3.182 greater than the critical t = 1.30
   d. Computed t = 2.182 greater than the critical t = 1.003

7. The table below shows the scores of 7 students in their 50-item midterm examination in English(x) and Statistics(y): what is the equation of the regression line?

X	25	30	15	45	12	44	22
Y	36	35	6	5	40	10	24

a. y = 0.58x+38.22 b. y = -0.58x-38.22 c. y = 0.58x-38.22 d. y = 0.58x+38.22

For number 8

The figures given below pertain to the annual disposable income and consumption expenditure of five families:

Disposable(X)	8.5	14.9	10.5	20.5	22.8
Consumption(Y)	7.6	13.2	12.8	16.9	18.6

8. Which of the following is correct?

   a. There is a very low relationship between disposable income and consumption expenditure.
   b. There is a moderate relationship between disposable income and consumption expenditure.
   c. There is a very high relationship between disposable income and consumption expenditure
   d. There is a perfect relationship between disposable income and consumption expenditure.

9. A researcher investigates the relationship between family income and savings. Using the data from 15 families, the computed r income between income and savings was found to be 0.76. What is the conclusion if a 0.05 level of significance is used?

   a. Since the computed value of t = 4.22 is greater than the critical value of t which is 2.16, we reject the null hypothesis.
   b. Since the computed value of t = 2.01 is less than the critical value of t which is 2.306, we accept the null hypothesis.
   c. Since the computed t = 1.30 is less than the critical value which is 3.182, we accept the null hypothesis.
   d. Since the computed value of t = 6.22 is greater than the critical value of t which is 4.16, we reject the null hypothesis.

10. A student analyzed the Math grades of his classmates and the number of times they were absent in the subject. He found out that the regression line that will predict grade (y) if the number of absences (x) is known as y = 97.732-2.61X. What is the predicted grade of the student having no absences?

    a. 90 b. 95 c. 97 d. 99

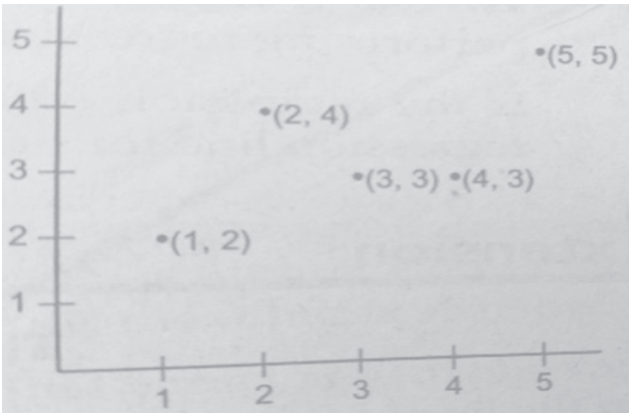
11. A sample of five measurements, randomly selected from an approximately normally distributed population, resulted in the summary statistics: Sample mean = 4.6, s = 1.5. Test the null hypothesis that the mean of the population is 6 against the alternative Use Solve the value of P.

    a. 0.0336 b. 0.0366 c. 0.0666 d. 0.333

12. The height of a random sample of 100 entering HRM freshmen of a certain college is 157 cm with a standard deviation of 8 cm. Test the data against the claim that the overall height of all entering HRM students is 160 cm. Previous studies showed that use . Solve the z

    a. 3.75 b. -3.75 c. 7.35 d. -7.35

For 13-14(refers to the picture)



13. The computed r, slope b, and y-intercept a, are?

    a. r = 0.48, b = 1.9, and a = 0.5

    b. r = 0.58, b = 1.9, and a = -.42

    c. r = 0.7, b = 3.67, and a = -.42

    d. r = 0.67, b = 3. 67, and a = .42

14. The predicted value of y when x is 2.5?

    a. 3.15 b. 3.45 c. 3.75 d. 3.95

For Number 15.

In a contest for Mr. Campus Personality, two judges gave their rank to 8 candidates.

Candidate	1	2	3	4	5	6	7	8
Judge 1	1	2	3	4	5	6	7.5	7.5
Judge 2	4	2	1	3	5	6	7	8

15. Which is the best interpretation of the above problem?

a. The two judges have a "very high" degree of agreement. It is implied that as to the selection of Mr. Campus Personality, the two judges are more or less the same.

b. The two judges have a " very low" of agreement. It implies that as to the selection of Mr. Campus Personality, the two judges are less the same.

c. The two judges have a "perfect" agreement. It implies that as to the selection of Mr. Campus Personality, the two judges are the same.

d. The two judges have a "moderate" of agreement. It implies that as to the selection of Mr. Campus Personality, the two judges are a little bit more the same.

Vertical Farming

Climbing Towards Sustainable Future

(An Innovative Experiment bySadhu Vaswani International School for Girls, New Delhi, India)

Ridhima Sehrawat, Rudrakshi Verma, Santosh Vyas and Yamini Bisht

In the emerging years of agricultural innovations, it has been seen that about 30% of land is degraded worldwide, and about 3.2 billion people reside in these degrading areas. Currently, 80% of the Earth's land that is suitable for agriculture is already being farmed. More land will need to be converted to farmland to support the needs of the increased population. This means more natural habitat destruction. The farmers also struggle with bridging the gap between demand and supply of crops using traditional farming methods, and more innovative and efficient cultivation techniques continue to surface. The usage of vast land for food crop production still remains a problem. To minimize these limitations, we can use vertical farming as a sustainable and viable alternative. It is an agricultural device under which crops are grown in vertically stacked layers.

Vertical farming shows great potential in addressing issues, in particular land scarcity and water usage, and ensuring food security. But as time has gone on, it has become apparent that vertical farming has certain limitations. For example, the high cost of vertical farming and the high energy consumption resulting from the use of artificial LED lighting In order to overcome these constraints, we have thought of making some modifications to the existing vertical farming project. For example, switching out the high-energy-consuming LED lights with mirrors that reflect natural light, which is good for plant growth, We have also devised ways to address the land shortage issue by practicing vertical farming in abandoned buildings or by repurposing ship containers.

In order to enable field irrigation, rainwater harvesting systems can be installed. According to a study by the National Institute of Agricultural Economics and Policy Research, the cost of setting up a vertical farm in India can range from Rs. 50 lakhs to Rs. 1 crore per acre, depending on the type of technology used. This includes the cost of setting up the vertical farm structure, the cost of lighting, irrigation systems, nutrient solutions, and other inputs required for crop growth. The cost can be cut drastically by implementing the suggested modifications.

Consequently, vertical farming is what agriculture will look like in the future. One of the main objectives of the G20 meeting, sustainable and green growth, is the subject of our study. Its goal is to turn abandoned urban areas into thriving green sanctuaries.

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