WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Appraising Facilitators' Perception on Effectuality of Gamification Instructional Strategy on Learning Mathematical Concepts in Literacy Programme, South West, Nigeria

[1]Mrs Oloja, Olukemi Ayodele, [2]Agun, Paulinal Olusola, [3]Akinbebije, John

[1]Department of Curriculum and Instruction, Adeyemi Federal University, Ondo, Ondo State, Nigeria.
[2]Department of Continuing Education/Adult and Non-Formal Education, Adeyemi Federal University, Ondo, Ondo State, Ni
[3]Department of Continuing Education /Adult and Non-Formal Education, Adeyemi Federal University, Ondo, Ondo State, Nigeria.

ABSTRACT

Learning of mathematics concepts have been found difficult for learners in literacy programme, thus, necessitated the study. The study population comprises, facilitators of literacy programme in south-west, Nigeria. the sample size of the study was one hundred and eighty (180) respondents, selected through a simple random sampling technique. Two research questions were raised, while one research hypothesis was formulated for the study. Data was generated through self-developed research instrument by the researcher, titled, "Appraising Facilitators Perception on Effectuality of Gamification Instructional Strategy on Learning Mathematical Concepts in Literacy Programme in South West, Nigeria. It was fashioned on four likert scale ; strongly agree, (SA), Agree (A), Disagreed (D), Strongly Disagree (SD). The research instrument was validated by two experts in test and measurement, while the reliability was obtained. Based on the findings of the study, conclusion were made that gamification instructional strategy could increase learners' motivation, develop their self-efficacy and their high rate of learning of mathematical concepts. Based on the conclusion, recommendations were therefore made by the researchers that; facilitators teaching mathematical in literacy programme should be adopting gamification instructional strategy while teaching mathematics. Also, all logistics for workability of gamification strategy should be provided at literacy programme centres by the providers of the programme in South-west, Nigeria etc.

Keywords: Gamification, Instructional strategy, Effectuality, Mathematical Concepts, Literacy Prpogrammes.

Background to the study

The implementation of literacy programme in Nigeria is purpotedly to reduce a high level of illiteracy in the country. Egunyonu (2015), stated that Nigeria is a member of a nation, which have majority of their citizenry are illiterates. Aderinoye (1997), defined illiterate is a person who can not read, write and complete a simple mathematical to solve daily challenges. Therefore, literacy programme allows indviduals to acquire knowledge and skills through a variety of activities, promote informal learning, and encourage people to make and follow their own educational plans. It is one the basis of the above that many countries, Nigeria inclusive are making literacy programme a top priority. People are attending literacy classes with varying intentions and purposed. However, majorly to read, write and simple mathematical computation and skills. Succinctly, literacy can be defined as an individual ability to read, write and speak in English and also compute and solve problem at level of proficiency necessary to function on the job and in the society to achieve one's goals and develop one's knowledge and potentials.

Acquisition of mathematics concepts or arithmetic skills is one of the major components of literacy programme which incudes; number/geometry; addition/subtraction number/ cicle; estimation of quantity /shapes in two dimensions; cardinal number/ ordinal number; comparing/sets; understanding of cardinality /classification; number /space and shape. Hogan (2016), identified counting, addition and subtraction, measurement and data and geometric as the four major mathematical concepts. Acquisition of competency and skills on these four areas are needed to enable one to be a functional literate of the society. In one of the several definitions of literacy "programme without calculation and work component is not functional in the context and outlook (Hunter, 1989).

However, several scholars and researchers reported, based on their findings that learners' performance in mathematics is discouraging considering the place-value of mathematics as a foundation of scientific technological knowledge that is vital in social-economic development of a nation (Ayebale, Habaasa and Twehego, 2020). Mathematics knowledge is necessary in socio-economic life of any human being.

Poor performance of learners in mathematics of all levels of education, formal and non-formal system of education have been attributed to diverse factors by some scholars. Wong and Wong (2019) attributed interest to performance in mathematics in Malaysia. The contention is that poor or low performance is a result of learners negative attitude and lack of interest in learning mathematics.

Ale (1989), reported that students' performance in mathematical at both internal and external examination has remained considerably poor. According to the sun news ("outrage traits students' poor performances", 2014). Out of 1.6 million students that took the 2014 May /June West Africa Senior School Certificate Examination (WASSCE), only a little more than half a million (31.28%) passed with minimum requirement for admission into tertiary institutions. Ldowu (2015) attributed to teachers' factors, since they are custodians of knowledge attaitment of knowledge by learners is strictly tied to teachers' quality. Avong (2013), stated that shortage or qualified mathematics teachers isa contribute factor to poor performance of learners in mathematics Osuade and Izevbigle (2006) stressed that teachers' attitude to mathematics also has negative influence on effective learning of the subject.

Furthermore, lack of non-human resources such as: teaching aids/materials, conducive classrooms and so on are also factors that are not promoting good performance of learners in mathematics. All the above identities factors by the scholars are also factors affecting the teaching of mathematical concepts in literacy programme poor performance of learners mathematical in literacy programme in Nigeria has not only be a source of worry and concern is the providers of literacy programme. It has been a good source of carrying out to researchers. Several studies had been conducted on mathematics and allied topics in relation to literacy programme in Nigeria specifically on the adoption of modern government strategies.

However, from the available extent literature and researches much studies have not be carried out on appraising facilitators perception on effectively of gamification instructional strategy on learning mathematical concepts in literacy programe in South -West, Nigeria, specifically. It was this observed gap that motivated the researchers to carry out the study.

Statement of the Problem

Literacy programme specifically focuses on teaching illiterates on ability to read, write and carry out a simple mathematics activities. However, learners' performance in mathematics is poor thus, had necessitated adoption of some modern instructional strategies in the teaching of mathematical concepts. Despite this, poor performance of student is still the case. Several factors had been attributed to this unslavery trend.

From the existing studies on the teaching of mathematics studies, empirically had not beee done on appraising, facilitators perception on effectuality of gamification instructional strategy on learning mathematical concepts in literacy programme in South-Wes, Nigeria. it is against this background of the stud was conducted by the researchers.

Research Questions

Two research questions were raised to guide the conduct of the study.

- Can gamification instructional strategy motivate learners towards achieving good performance in mathematics in literacy programme in South-West, Nigeria.
- Will gamification instructional strategy enhance high learning rate among the mathematics in literacy programme in South-West, Nigeria.

Research Hypothesis

One research hypothesis are formulated to guide the conduct of the study

Ho1: there will be no significant relationship between gamification instructional strategy and learners self-efficacy in mathematics in literacy programme in South West, Nigeria.

Purpose of the study

A broad purpose of study was on appraising facilitators' perception on effectuality of gamification instructional strategy on learning mathematics concepts in literacy programme in South-West, Nigeria. specifically, the purposes of the study were to:

- Examine learners' performance in mathematics in literacy programme in Sout-West, Nigeria;
- Establish the influence of gamification instructional strategy instructional delivery competnecny in teaching of mathematical concepts in literacy programme in South-West, Nigeria; and
- Determine the relationship between gamification instructional strategy and learners self-efficacy in mathematics in South-West, Nigeria.

The findings of the study are significant in the following ways;

Firstly, the result of the study will enable the provider of literacy programme to know the influence of gamification instructional stategy on effective learning of mathematics concepts. Besides, the findings to the research will provide a base line data also on the relationship between gamification instructional strategy and instructional delivery competency in the teaching of mathematical to stakeholders in literacy programme in South-West, Nigeria.

Finally, the study will add to the extent literature within the study area and also be useful to researcher in future.

Methodology

Descriptive survey research design was adopted for the study. The study population comprised, facilitators of literacy programme in South-West, Nigeria. the sample size of the study was one hundred and eighty (180) respondents, selected through a simple random sampling technique. A centre with the highest number of learners' enrolment in each of the six states in South-West, Nigeria (Lagos, Osun, Oyo, Ogun, Ondo and Ekiti State) was selected and thirty (30) respondents were selected. Two research questions were raised, while one research hypothesis was formulated for the study.

A self-employed researchers instrument was developed by the researchers, titled, "Appraising facilitators perception on effectuality of gamification instructional strategy on learning mathematics concepts in literacy programme in South-West, Nigeria". it was fashioned on four likert rating scale of strongly agreed (SA), Agreed (A), Disagreed (D), Strongly Disagreed (SD). The research instruments was validated by an expert in test and measurement, while its reliability was determined through test-retest method at two weeks interval 0.64 coefficient reliability was obtained.

Data collected on research questions was analysed through the use of descriptive statistics (frequency counts, simple percentage and mean), while data collected on research hypothesis was analysed using (spearman ranking correlation coefficient).

Conceptual Framework and Teaching of Mathematics Gamification Strategy

Gamification strategy has multiple explanation and definitions. However, what is fundamental is that gamification is a strategy or technique to introduce same things in non-game context (defending Miguel, Lewnard, O. Hara, Dixob and Eachi 2010). Gamification is a product of digitization era that is designed to engage students in order to help them achieve learning objectives. Gamification strategy can motivate students in order to help them achieve learning objectives. Gamification strategy can motivate students to engage in the classrooms give teachers better tools to guide and rewards student and get student to bring their full selves to the pursuit of learning (Dixit, Nirgude and Valagi,, 2019).

Gamification in learning involves game based elements such as; point scoring, peer competition, team work, score tables to drive engagement, help students to assimilate new information and test their knowledge. The incorporation of gamification as strategy today is to assist students to overcome their difficulties in learning. One of the major problems in school nowadays is that students lack motivation towards learning, thus, necessitated introducing gamification strategy. Gamification has been found to have motivated impact on learners. Therefore, gamification is an educational strategy to approach that seeks to motivate students by using video game design and game elements in learning environment. The goal is to maximize enjoyment and engagement by capturing the interest of learners and inspiring them to continue learning.

From some available literature and studies, students' performance in mathematics have been worrisome and discouraging. However, the use of gamification strategy has motivational effects on learners in mathematics lesson. Gamification is a game and using it brings participate, interaction and entertainment as opposed to passive activities like watching it or reading (Glover, 2013). Gamification has been found to be more effective in attaining optimum learning compared to the use of of the traditional method of curriculum delivery on teaching process. (Zabala).

A paranomic view of literature on influence of gamification strategy on leanring of mathematics revealed that gamification strategy given students opportunities to explore fundamental number concepts, such as the counting sequence, one-to-one correspondents and computation strategies. Engaging mathematics games can encourage students to explore number combinations, place value, patterns and other important mathematical concepts.

Presentation of findings and discussion of Results

Presentation of findings

Research Question one: can gamification instructional strategy motivate learners towards achieving good performance in mathematics in literary programme in South-West, Nigeria?

Table 1: showing frequency counts, simple percentage (%) and mean (x) on can gamification instructional strategy motivate learners towards achieving good performance in mathematics in literacy programme in South West, Nigeria

S/N	ITEMS	SD	D	`A	SA	MEAN	DECISION
1	Using gamification instructional strategy will captivate learners interest towards learning mathematics	3 1.66	9 5	12 6.66	156 86.66	**3.76**	**Accepted**
2	Gamification instructional strategy will not captivate learners interest towards learning mathematics	144 80	15 8.33	12 6.66	9 5	**1.36**	**Rejected**
3	By using gamification instructional strategy learners will be more curious to learn mathematics	4 2.22	9 5	16 8.88	151 83.8	**3.74**	**Accepted**
4	Gamification instructional strategy does not increase learners curiosity to learn mathematics	146 81.11	23 12.77	5 2.77	6 3.33	**1.28**	**Accepted**

5	Gamification instructional strategy make teaching and learning setting in mathematics more lively and motivating to the learners	8 4.44	6 3.33	15 8.33	151 83.8	**3.71**	**Accepted**
6	Using gamificational instructional strategy has no live ability and motivational effects in teaching and learning of mathematics s	149 82.77	11 6.11	11 6.11	9 5	**1.33**	**Rejected**
	TOTAL	**454** **42.03**	**73** **6.75**	**71** **6.57**	**482** **44.62**	**2.53**	**ACCEPTED**

Table 1 present findings on research question one. On item (1), responses obtained indicate 156 (86.66), 12 (6.66), 9 (5) and 3 (1.66) for strongly agreed, agreed, disagreed and strongly disagreed, on item (2), 9 (5), 12 (6.66), 15 (8.33) and 144 (80) responses were obtained for strongly agreed, agreed, disagreed and strongly disagreed. On items (3), responses obtained shows 151 (83.8), 16 (8.88), 9 (5) and 4 (2.22) for strongly agreed, agreed, disagreed and strongly disagreed. On items (4), 6 (3.33), 5 (2.77), 23 (12.77) and 146 (81.11) responses obtained for strongly agreed, agreed, disagreed and strongly disagreed.

On item (5), responses obtained indicate 151 (83.8), 15 (8.33), 6 (3.33) and 8 (4.44) for strongly agreed, agreed, disagreed and strongly disagreed, respectively. Finally, on item (6), 9 (5), 11(6.11), 11 (6.11) and 149 (82. 77) for strongly disagreed, agreed, disagreed and strongly disagreed respectively.

Genially speaking the average of rating scale of four (x = 2.5) is lesser than the gamification instructional strategy could positively influence learners' motivation towards learning of mathematics concept in literacy programme of South-West, Nigeria.

Research Question Two: Will gamification instructional strategy enhance high learning rate in delivery mathematics in literacy programme in South-West, Nigeria?

Table 2: Showing frequency counts, simple percentage (%) and mean (x) on will gamification instructional strategy enhance high learning rate in mathematics in literacy programme in South West, Nigeria.

S/N	ITEMS	SD	D	`A	SA	MEAN	DECISION
7	Learning can increase at a high rate using gamification instructional strategy	6 3.33	8 4.44	17 9.44	149 82.77	**3.71**	**Accepted**
8	Gamification instructional strategy as no influence on a high learning rate in mathematics	125 69.44	33 18.33	16 8.88	6 3.33	**1.46**	**Rejected**
9	Gamification makes mathematical concepts easily understand by the learners	6 3.33	4 2.22	22 12.22	148 82.22	**3.73**	**Accepted**
10	Despite using gamification instructional strategy learning will still not understand mathematical concept	143 79.44	19 10.55	9 5	9 5	**1.35**	**Rejected**
11	Learners will be able to solve mathematical problem using gamification skills	4 2.22	14 7.77	22 12.22	140 77.77	**3.65**	**Accepted**
12	Despite acquiring gamification skills by the learners will still find it difficult to solve mathematical problems	144 80	21 11.66	10 5.55	5 2.77	**1.31**	**Rejected**
	TOTAL	**428** **39.62**	**99** **9.16**	**96** **8.88**	**457** **42.31**	**2.53**	**Accepted**

Table 2 shows the finding on research question two on item (7), the following responses were obtained; 149 (82.77), 8 (4.44) and (3.33) for strongly agreed, agreed, disagreed and strongly disagreed. On item (8), responses obtained were 6(3.33), 16 (8.88), 33 (18.33) and 125 (69.44) for strongly agreed, agreed, disagreed and strongly disagreed. On item (9), responses obtained were; 148 (82.22), 222 (12.22), 4 (2.22 and 6 (3.33) for strongly agreed, disagreed and strongly disagree.

On the items (10), 9 (5), 19 (10.55) and 143 (79.44) for strongly agreed, agreed, disagreed and strongly disagreed. On item (11), 140 (77.77), 22 (12.22), 14 (7.77) and 4 (2.22) for strongly agreed, agreed, disagreed and strongly disagreed. Finally, on item (12), 5 (2.77), 10 (5.55), 21 (11.66) and 144 (80) for strongly agreed, agreed, disagreed and strongly disagreed.

Generally, speaking the average rating scale of four (x=2.5) is lesser than the man of average rating scale of fur (x=2.53). This indicates that gamification instructional strategy could enhance a high learning rate in mathematics in literacy programme in South West, Nigeria.

Research Hypothesis

Ho1: There will be no significant relationship between gamification instructional strategy and learners' self-efficacy in mathematics literacy programme in South West, Nigeria.

Table 3: There will be no significant relationship between gamification instructional strategy and learners self-efficacy in mathematics in literacy programmes in South West, Nigeria.

S/N	NAMES OF LITERACY CENTRES SOUTH-WEST, NIGERIA	Gamification instruction	Rx	LEARNERS	R_y	$R_x - R_y$	D
1	LC, Ajegunle pry. School, Lagos State	40	1	36	1		0
2	LC, Ibadan Pry, Sch Olode Apapa, Lagos State	36	2	34	2		0
3	LC, Akoko South West Ondo State	18	5	16	5		0
4	LC, Ondo West, Ondo State	15	6	14	7		-1
5	LC, Iworo Quarters Omuo Ekiti, Ekiti State	1	1	3	11		-10
6	LC, Ekiti East L. G. A Okuo Ekiti	20	3	19	4		-1
7	LC, Abeokuta South, Ogun Sate	19	42	1	3		1
8	LC, Nou. D Abeokuta North, Ogun State	8	8	7	9		-1
9	LC, Bodija Ibadan, Oyo State	10	7	9	8		-1
10	L/C Agodi, Ibadan, Oyo State	7	9	5	10		-1
11	LC Ilesa, Osun State	4	10	15	6		4
12	Lc, Ile-Ife, Osun State	2	11	1	12		-1

$\sum D^2 = 21$

VARIABLES	N	DF	D^2	D-cal	D-critical	Decision
X	12	10	21	0.98	0.648	**X**
Y	12					

X is significant at 0.05 alpha level

Since, p- calculated is greater than p-critical the null hypothesis is rejected. This implies that there is significant relationship between gamification instructional strategy and learns' self-efficacy in mathematics in literacy programme in South West, Nigeria.

Discussion of Results

The result on research question one indicates that gamification instructional strategy could positively influence learners' motivation towards learning of mathematics concept in literacy programme in South West, Nigeria. the result aligns with the submission of Deterching et at (2011), who claims that gamification promotes motivation among learner towards learning. Also, Huotari and Hamara (2012) states that gamifications strategy motivating gainful experience for learners. Also, the result on research question two is also corroborated by Smiderie Rigor Marquesm et al, that gamification instructional technique to increase a high learning rate by the learners, hence it engaging them by incorporating game elements into an educational environment. Further, gamification enhances certain abilities of the learners such as; introduce objective that gives learning a purpose, engage students, optimize learning support behaviour change towards learning etc. the cumulative effects of these as that through gamification strategy in teaching process, learners can learn at a fast and high rate.

The research on hypothesis one also shows that there is a high positive relationship between gamification strategy and learners self efficacy in learning of mathematical concepts. This result align with the submission of Bandara (1997) and Zinimerman (2000), that there is a storms connection between gamification strategy and learners high efficacy, persistencies and improved academic activities.

The result is also supported by the opinion of Ryan and Deci (2000) that gamification has motivational effort on learners which make them to have a sense of being carrying out work independently. In a nutshell, what this indicates is that by introducing same into learning situation in mathematics classes student often develop a sense of self-efficacy in carrying out some mathematical concepts in literacy programme.

Conclusion

Based on the findings of the study the following conclusions were made that; gamification instructional strategy could enhance learners motivation and high learning rate in learning mathematical concepts in in literacy programme in south-west, Nigeria.

Also, that gamification strategy could also enhance learners' self-efficacy towards learning of mathematical concepts in literacy programmes in south-west, Nigeria.

Recommendations

Based on the conclusion, the following recommendations were made;

- Since, gamification strategy has a positive influence on learners' interest towards learning of mathematical concepts the method or strategy should be incorporated as a compulsory andragogical strategy in teaching of mathematics in literacy programme, especially during the teaching of mathematics.
- The facilitators of literacy programme, especially those teaching mathematics should be advised and encourage to be adopting gamification strategy, while teaching mathematics.
- The facilitators teaching mathematics should be rude to acquire competency in using gamification strategy
- All logistics such as; provision of gamification games at literacy programe should be done by the providers to literacy programme in south-west, Nigeria etc.

References

Hinter, C ST. J (1989). "Adult literacy n developed countries" In Titmus C. L (eds). Life long education for Adults. An International Handbook. Toronto Regamon.

Aderinoye, R. A (1997). Financial literacy in Nigeria, Ibadan : Ibadan University Press.

Ayebale, L, Habassa, G & Tweheyo. S (2020). Factors affecting students' achievement in mathematics in secondary schools in developing countries: A rapid systematic review. Statistical journal of the IAOS, 36 (1): 73-76.

Wong, S. L. & S. L. (2019). Relationship between interest and mathematics performance in a technology enhanced learning context in Malaysia. Research and practice in Technology Enhanced Learning, 21.

Ale, S. O. (1989). Combating poor achievement in mathematics ABACUS. The journal of the mathematics Association of Kligema, 19 (1): 11-23.

Idowu, O. O. (2015). Pres-service teachers perception on poor performance of elementary school students in mathematics of elementary school students in mathematics . unpublished manuscript, college of Education, University of Wyoming. U. S. A.

Avong, H. N. (2013). Poor performance in mathematics among senior secondary school student in Kaduna State. What's to blame? Journal of Research on National Development, 11 (2), 319-324.

Osunde, A. U & Izebigie, T. I (2006). An assessment of teachers' attitude towards teaching profession in Midwestern Nigeria. Education, 126 (3), 462-467).

Hamarin J. (2013). Transforming hand economics into homo ludens. A held experiment on gamification in a utilization peer-do-peer trading service. Economic commerce research and application; 112 (4): 236-245.

Zabala, O. (2021). Effect of gamification as an approach in teaching mathematics. International Journal of Unrest Research.

Deterding, S. Dixon, D, Khaled, R & Nace, L. (2011). From game resign elements to gamfication; defining gamification. Proceeding of the 15th International academic mindtrack conference: envisioning to rethink gamification. Rethinking gamification 305-323.

Smiderie, R, Rigo, S. J. Marques, L B. et al (2020). The impact of gamification on students; learning, engagement and behaviour based on their personality traits smart learn. Environ, 7, 3 https://doi.org/10:1186/540561-019-0098-x

Banaura, A, (1997). Self efficacy: the exercise of control . W. H. Freeman & Co.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn, contemporary educational psychology, 25 (1), 82-91.

Ryan, R. M & Deci, E. L (2000). Intrinsic and extrinsic motivation: classic definitions and new directions contemporary educational psychology, 25 , 54-67.

Dixit, R. K. Nirgude, M. A. & Yalagi, P. S. (2019). Gamification: An instructional strategy to engage learners. https://.researchgate.net/publication.accesed

Deterding S, Miquels, S, Lennart, M, O, Hara, K, Dixton D and Eachi, C. (2011). " Gamification using game-design elements in non-gaming context", published in "11" . Extended abstracts on Human Factors in Computing Systems, pg 2425-2428.

Glover, I. (2013). Play as you learn: Gamification as a technique for motivating learners in proceedings or world conference on educational multimedia.

Hypomedia and telecommunication. http://shura.sha.acuk/7172p.accesed