Research Article

Global Media Journal
ISSN 1550-7521

2017
Vol. 15 No. 29: 76

Integration of Biological Concepts Using Localized Gambling Games in Teaching Elementary Statistics

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Citation: Rojas NI, Olonan SAS. Integration of Biological Concepts Using Localized Gambling Games in Teaching Elementary Statistics. Global Media Journal. 2017, 15:29.

Abstract

Both Science and Mathematics are indeed essential and each subject is considered to be of equally important co-existence. While Biology (as a sub-group of Science) includes a scholarly investigation of life and its marked relation with the environment, Mathematics on the other hand (specifically Statistics), involves processes of scientific measurement, evaluation and quantification of any phenomena in order to substantiate its occurrence. Thus, this study – as anchored on the stated vital association of Science and numbers, was designed to identify if the integration of specific concepts in Biology (Phenotypes and Genotypes) may be accepted as a contextualized lesson in Elementary Statistics – focusing on Frequency and Percentage distribution, and Probability (ratio and proportion). The researcher had devised 2 localized "gambling games"- "tossing coins" and "tossing of dice" in order to explain both concepts in Biology and Statistics. The Math majors and BEEd students of the College of Teacher Education of the Nueva Vizcaya State University, Bambang campus during the 2nd semester of SY 2015 – 2016 were considered in the sampling selection of the study. Making use of a self-made evaluation tool (validated by research experts), the respondents were asked to rate the level of acceptability of the contextualized lesson plan. Independent t-test was employed in order to determine significant difference on the respondents' evaluation and performance between the 2 groups of respondents based on performed learning tasks. Findings of the study manifested that the respondents are collectively "much agree" toward the acceptability of the designed lesson plan.

Keywords: Integration; Biology; Elementary statistics; Lesson exemplar; Contextualize; Gambling games; Acceptability

Received: December 11, 2016; Accepted: July 15, 2017; Published: July 30, 2017

Introduction

Both Science and Mathematics are indeed essential and each subject is considered to be of equally important co-existence. While Biology (as a sub-group of Science) includes a scholarly investigation of life and its marked relation with the environment, Mathematics on the other hand (specifically Statistics), involves processes of scientific measurement, evaluation and quantification of any phenomena in order to substantiate its occurrence.

The insufficiencies of quantitative awareness and approaches in teaching Biology have been observed over the years [1]. Thus, difficulties in utilizing concepts in Biology as an alternative subject matter in teaching Numerical courses are also evident. Most often than not, Mathematics and Biology are taught in near independence of each other [2]. This instructional strategy often gives the students analogous strands of learning competencies, however, are unable to comprehend how each subject area intertwines with each other. Learners find challenges applying their lesson from one subject to another and most likely could no blend their knowledge into a unified structure. Emerging conventional educational ingenuities essentially along coalescing laboratory processes with mathematical skills, yet it seems that most curricula focused on a single connection between systematic knowledge and scientific scheme, from which the validity of knowledge claims, mediated in terms of their reliability with data. Collecting data and obtaining results are generally part of science, but are not science itself. We visualize that the operational use of the complete scientific method will play a critical role in providing the compulsory underpinning for the incorporation of math and biology at several professional altitudes [3]. The American Association for Advancement Science (AAAS, 2011) [4] through the *Vision and Change in Undergraduate Biology Education* report suggested the need to concentrate on the core competencies of quantitative reasoning, modeling, and simulating complex systems. Undergraduate students should acquire how to rub in quantitative skills Biological themes and use quantitative reasoning to interpret data. Hence, students should be able to develop skills on the use of modeling and in reconnoitring systems with computational slants [5].

In response to the 21st century challenges of Mathematics and Science Education in the Philippines, a designed research conference was designed by the University of the Philippines – National Institute of for Science and Mathematics Education Development (UP-NISMED) [6] in gratitude of the significance of globalizing the developments, methodologies and schemes of concocting citizens who will be able to discourse and unravel local, national and global problems, as well as function correspondingly thriving. This is in recognition of an inordinate prerequisite to altercation notions on how to edify the young in terms of the knowledge and skills exemplified in science and mathematics, and at the same time take advantage of available technology. The conference was themed *"Empowering the Future Generation through Science and Mathematics Education,"* and identifies the following academic objectives: 1) provide a forum to review issues, exchange ideas and share experiences on the development of Science and Mathematics education at all levels; 2) discuss developments in Information and Communication Technology (ICT) integration to improve learning of Science and Mathematics; 3) exchange ideas on continuing professional development as a means to sustain the development of high quality Science and Mathematics teachers; 4) encourage the sharing of knowledge, skills and experiences of experts working on new strategies to sustain Science and Mathematics education reforms in teaching and assessment; 5) strengthen professional networking among Science and Mathematics educators both locally and globally; and 6) maintain professional contacts to enhance cooperation among a consortium of international organizations and educational institutions to facilitate greater dissemination and exchange of expertise at an international level.

With the above justifications, this study was then developed as to integrate concepts in biology in a localized learning strategy incorporating *"gambling games"* among selected Mathematics major and BEEd students of the College of Teacher Education of Nueva Vizcaya State University, Bambang campus during the 2nd semester of the school year 2015-2016.

Framework

As such, this conceptual paradigm was used by the researcher in order to complete this lesson exemplar based on the main objectives of the study **(Figure 1)**.

The research paradigm was conceptualized based on developing a lesson plan using concepts in Biology *(Genotype and Phenotype)* in teaching subject matter in Elementary Statistics *(Frequency & Percentage; and Probability)* among the target respondents as a response to the trends of the 21st Century Education of localizing and contextualizing lessons. Two gambling games were devised by the researcher as learning task in order to explain the selected topics in Biology and Statistics *(toss coin and tossing dice).*

Objectives of the study

This study was patterned from a lesson exemplar in Elementary Statistics using concepts of Biology among the target respondents with the purpose of assessing the acceptability of such instructional strategy based on the evaluation of the respondents. Specifically, this study was aimed at answering the following questions:

1. What is the respondents' level of performance in the simulated learning tasks?
2. How do the respondents evaluate the level of acceptability of the designed lesson exemplar in Elementary Statistics using concepts in Biology?
3. Is there a significant difference in the level of performance and evaluation on level of acceptability between the two groups of respondents based on performed learning tasks?
4. Is there a significant relationship between the respondents' level of performance and evaluation on the level of acceptability of the lesson exemplar?

Methodology

The study had employed the importance of descriptive-qualitative-quantitative research approach in order to describe the selected constructs included in the investigation. As discussed by Cudia and Tallungan [7], this approach is necessary as to qualify and quantify pertinent data in conducting research. In the study, performance and perceptions of the study were subjected for descriptive and inferential analyses. A designed lesson exemplar in the said subject was checked and approved by the program directors of secondary and elementary courses and counter-validated by the college dean of the College of Teacher Education. In order to gauge the learning competencies of the randomly selected 50 3rd year CTE students (using strata

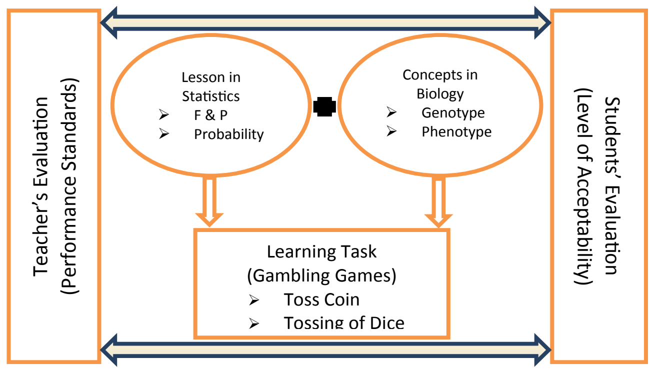

Figure 1 Conceptual paradigm.

of Mathematics major and 30 BEEd students), two *"gambling games"* were devised as learning tasks – one group for "toss coin" and another set for "tossing of dice".

The following tables explain the integration of the selected Biological concepts and how the learning tasks were simulated **(Table 1)**.

As stipulated in **Table 1**, the concept on Genotype and Phenotype shows probable combination of dominant and recessive traits from combinations of mother and father cells. The daughter cells based on the crossing over of probable traits (DD, Dd, dd) x (DD, Dd, dd) – which pertains to penotype pairing *(36 expected pairings)* shall yield either 100% DD, 100% Dd, 50%Dd, 50% dd, 75% DD, and 100% dd with corresponding phenotypes of either dominant, dominant (but carrier of recessive) or recessive traits. **(Table 2)**

Two groups were given 2 different learning tasks to perform within 10 minutes. For the group that was asked to perform the toss coin, students had computed for the corresponding results of tossing 2 coins with combinations of head-head (HH), head-tail (HT), and tail-tail (TT). Meanwhile, the other group who did the tossing of dice were asked to compute the probability of certain number combinations of throwing a pair of dice **(Table 3)**.

Table 1: Genotype and phenotype pairing.

Pairing or Crossing	DD	Dd	dd
DD ➢ Genotype ➢ Phenotype	DD x DD=DD 100% DD 100% Dominant	DD x Dd=(3/4) DD, (1/4) Dd 75% DD, 25% Dd 100% Dominant	DD x dd=Dd 100% Dd 100% Dominant
Dd ➢ Genotype ➢ Phenotype	Dd x DD=(3/4) DD, (1/4) Dd 75% DD, 25% Dd 100% Dominant	Dd x Dd=(1/2) DD, (1/2) Dd 50% DD, 50% Dd 100% Dominant	Dd x dd=(1/2) Dd, (1/2) dd 50% Dd, 50% dd 50% Dominant, 50% Recessive
dd ➢ Genotype ➢ Phenotype	dd x DD=Dd 100% Dd 100% Dominant	dd x Dd=(1/2)dd, (1/2) Dd 50% dd, 50% Dd 50% Recessive, 50% Dominant	dd x dd= dd 100% dd 100% Recessive

Table 2: Simulated Gambling Games in Teaching Science and Statistics**.**

A. Toss Coin (60 Tosses)						
Group 1	HH		HT		TT	
Tally	||||||||||||||||||||		||||||||||||||||||||		||||||||||||||||||||	
Frequency	20		20		20	
Percentage	33.33		33.33		33.33	
Ratio	1:3		1:3		1:3	
B. Tossing of Dice (Probability of Combinations)						
Group 2	1	2	3	4	5	6
1	11	12	13	14	15	16
2	21	22	23	24	25	26
3	31	32	33	34	35	36
4	41	42	43	44	45	46
5	51	52	53	54	55	56
6	61	62	63	64	65	66

(Note: the data are only examples, the respondents' performance were based on the actual simulated games).

Table 3: Performance Standards in the Simulated Learning Task.

Indicator	Numerical Rate					Total
	5	4	3	2	1	
Participation and Group Dynamics	95-100% of the group/ students	95-100% of the group/ students	85-89% of the group/ students	80-84% of the group/ students	below of the group/ students	
Accuracy of Work	Beyond expectation, finished task before the given time limit	As expected, finished task at the given time limit	With minor errors, finished task at the given time limit	Answers are incomplete but correct, time limit not observed	Did not able to meet expectations, time limit not observed	
Group Learning	All manifest eagerness to learn by sharing taught for the completion of the task	1-2 students were only participants but unable to share significantly in the given task	3-5 students were only participants but unable to share significantly in the given task	5-7 students were only participants but unable to share significantly in the given task	8 or more students were only participants but unable to share significantly in the given task	x 2
Grand Total					Total Score/(4)	

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A teacher-made-validated rubric of evaluation was employed to identify the respondents level of performance based on the objectives and expected performance of the institutionalized subject syllabus for Elementary Statistics. Still, another teacher-made-validated evaluation was made by the researcher to evaluate the respondents' perceptions on the acceptability of the designed lesson plan in teaching Frequency and Percentage Distribution; and Probability using concepts on Biology *(Phenotype and Genotype).*

The following performance standard evaluation was developed by the researcher and underwent an expert validity to measure the level of performance of the target respondents in simulated learning tasks.

In order to interpret the said scores, the following qualitative description was then offered **(Table 4)**.

Meanwhile, the given scaling was used to interpret the evaluation of the respondents in the designed lesson exemplar. The evaluation was based on a validated questionnaire-checklist with the following indicators: performance standards; learning competencies; learning tasks; relevance; and mastery and delivery **(Table 5)**.

In order to elicit the relationship between the respondents' performance and evaluation, a two-way analysis of variance was employed in the computed means for the 2 points of investigation considering the two groups of respondents (based on the performed learning tasks). Hence, independent t-test was employed to determine significant difference on the level of acceptability of the designed lesson exemplar based on the evaluation of the 2 groups of respondents (according to their performed learning tasks).

Table 4: Qualitative descriptive.

Rate	Range	Qualitative Description
5	4.20-5.00	Outstanding
4	3.40-4.19	Very Satisfactory
3	2.60-3.39	Satisfactory
2	1.80-2.59	Good
1	1.00-1.79	Did not meet expectation

Table 5: The validated questionnaire-checklist indicators.

Rate	Range	Description	Interpretation
5	4.20-500	Very Much Agree	Very Much Acceptable
4	3.40-4.19	Much Agree	Much Acceptable
3	2. 60-3.39	Moderately Agree	Moderately Acceptable
2	1.80-2.60	Slightly Agree	Slightly Acceptable
1	1.00-1.79	Not Agree	Not Acceptable

Table 6: Summary on the Level of Performance of the 2 Groups of Respondents.

Group	Group 1 (Coin)	Group 2 (Dice)	Combined Mean	Qualitative Description
Participation and Group Dynamic	4	5	4.50	Outstanding
Accuracy of Work	4	4	4.00	Very Satisfactory
Group Learning	5	4	4.50	Outstanding
Overall Mean	4.50	4.25	*4.28*	*Very Satisfactory*
Interpretation	*Outstanding*	*Very Satisfactory*		

Results and Discussions

After gathering the pertinent data, these were tallied and tabulated and were quantified and qualified based on the statistical tools used by the researcher.

Respondents' level of performance

Table 6 manifested that the overall respondents' level of performance in the simulated learning tasks is qualified as *"very satisfactory"* with the numerical rate of 4.28, from which group 1 (toss coin) had the mean rate of 4.50 *(outstanding)* while group 2 (tossing dice) gave the mean rate of 4.25 *(very satisfactory).*

Detailing the specific indicators that were used to measure the respondents' performance, the combined means gave a mean rate for both participation and group dynamic, and group learning computed as 4.50 and being qualified as *"outstanding".* Meanwhile, for the indicator along accuracy of work, both groups were rated as 4.00 with the qualitative interpretation of *"very satisfactory".* The data implies that group 1, who performed the learning task on "tossing a coin" has higher performance than the group who did the "tossing of dice". Hence, it can also be deduced that for indicators along participation and group dynamic, and group learning, the student-respondents had shown outstanding performances on these aspects based on the evaluation given by the subject teacher (the researcher), and were rated very satisfactory for their accuracy of answers (the answers perse were based on the expected outcomes drawn by the researcher in lieu with the lesson on Statistics).

Giving light to the data presented in **Table 4**, Nieuwenhuis [8] recommended that providing more quantitative slants during the early training of biologists would improve their ability to handle mathematical models and consequently their aptitude to underwrite to and advantage from key approaches within their pitches of interest. Quantitative aptitudes are critical for analyzing data.

Similar on the concept of integrating Biological concepts in teaching Elementary Statistics, Barsoum et al. [9] explained that basic quantitative skills are established through scientific explorations that highpoint the close association of mathematics and biology. Throughout the explorations, students operate data sets and progress concepts from the data. The group presented an exploration that aided students calculate genetic distances and correlate these with geographic distance, using plant populations to better understand gene flow. Another exploration they presented is the use of simple geometry (area of a triangle) to approximate the amount of DNA present in each band from Meselson-Stahl's classic experiment on semiconservative DNA replication. Both Nieuwenhuis and the group of Barsoum presented quantitative techniques in developing learning toward Biology, on the other hand this study incorporated

Biology concepts instead using localized learning tasks in order to teach subjects on Frequency and Percentage distribution, and Probability. Hence, the approaches presented by cited authorities are almost the same instructional strategy being used in the designed lesson exemplar.

Respondents' evaluation

Based on the rates given by the respondents in the level of acceptability of the designed lesson exemplar in Elementary Statistics using concepts in Biology had shown the computed mean of 3.43 – which being qualified that the respondents are collectively *"much agree"* on the item-statements used to describe the indicators for acceptability. This is being qualitatively interpreted as *"much acceptable".* Both groups of respondents had shown a qualitative rating of *"much agree"* with the mean values of 3.48 for group 1 (coin) and 3.38 for group 2 (dice) respectively **(Table 7)**.

Particularly, among the 5 indicators, learning tasks was given the highest rate of 3.69 *(much agree/acceptable),* which would mean that the learning tasks included in the lesson plan is indeed much accepted as differentiated learning activities in teaching Statistics. Related to this indicator is the performance standards, which was given the second highest rate of 4.58 *(much agree/ acceptable),* which would as mean that the lesson exemplar is perceived to have provided a considerable set of criteria in order to determine the students' performance in a given lesson. Hence, this may as well be associated with the data shown in **Table 4**, which had determined the respondents' level of performance in the simulated learning tasks.

On the other hand, the 3 remaining indicators on the level of acceptability of the designed lesson exemplar were rated as *"moderately agree/acceptable"* showing the mean rates as 3.28 (learning competencies), 3.19 (relevance) and 3.22 (mastery and delivery). This may indicate an average regard among the student-respondents on the level of acceptability of integrating Biological concepts in Elementary Statistics.

In support to the designed lesson exemplar, the Institute's *Scientific Foundations for Future Physicians*, and the College Board Advanced Placement Biology Test each acknowledge the importance of quantitative reasoning and skills for modern biology National Research Council (NCR) [10]. Meanwhile, Kitts [11] suggested that mathematical approaches should be intensified as integral component of undergraduate biology education. Even within Biology, the increasing use of large data sets requires biologists to acquire skills in mathematics, particularly statistics, and computer science. The goal can best be manifested by integrating mathematical tools and approaches in all biology courses. For instance, a molecular forensics program can integrate the theme across the curriculum by integrating biology into applied areas that include databank design and a strong highlighting on data analysis **(Table 8)**.

Meanwhile, Oriero and Rojas had used localized games in the vocabulary acquisition skills of selected Grade 8 high students from which the respondents had rated the simulated games and enrichment activities as very effective. Hence, the respondents had shown high level of performance in the administered retention test for vocabulary. Oreiro and Rojas had integrated the use of localized games in teaching English, which could also be equated with the learning approach being integrated in the designed lesson exemplar. Still, both approaches believed that adding fun in classroom discussion such simulation of localized learning tasks may definitely promote interests among the learners.

Difference of the respondents' performance and evaluation

As gleaned in **Table 6**, no significant difference is seen in the performance level between the group of students who performed the tossing of coin and tossing of dice, which showed the *p-value* of 0.5369 and a computed t of 0.6547. Thus, this accepts the assumption of the null hypothesis, hence, would mean that both groups of students have the same level of performance in the simulated learning tasks in the designed lesson exemplar.

Table 7a: Summary on the Respondents' Evaluation of the Designed Lesson Exemplar.

Indicators	Group 1 (Coin)	Group 2 (Dice)	Combined Mean	Qualitative Description
Performance Standards	3.54	3.67	3.58	Much Agree
Learning Competencies	3.22	3.35	3.28	Moderately Agree
Learning Tasks	3.77	3.61	3.69	Much Agree
Relevance	3.19	3.19	3.19	Moderately Agree
Mastery and Delivery	3.58	3.06	3.22	Moderately Agree
Overall Mean	3.48	3.38	3.43	Much Agree
Interpretation	*Much Acceptable*	*Much Acceptable*	*Much Acceptable*	

Table 7b: Summary on the Difference in the Level of Performance between the 2 Groups of Respondents along the Performed Learning Tasks.

Indicators	Mean			
	Group 1	**Group 2**	***Computed t***	***p-value***
Overall Performance	4.5	4.25	*0.6547*	*0.5369*

(df=6,Crit-t is 2.4469, level of significance is 0.05).

Table 8: Summary on the Difference in the Evaluation on the Level of Acceptability of the Designed Lesson Exemplar between the 2 Groups of Respondents along the Performed Learning Tasks.

Indicators	Mean			
	Group 1	Group 2	Computed t	p-value
Performance Standards	3.54	3.67	*(-)0.7536*	*0.4548*
Learning Competencies	3.22	3.35	*(-)0.4645*	*0.6446*
Learning Tasks	3.77	3.61	*0.6350*	*0.5284*
Relevance	3.19	3.19	*0.0000*	*1.0000*
Mastery and Delivery	3.58	3.06	*2.9169*	***0.0362****
Overall Acceptability	3.48	3.38	*0.2744*	*0.7845*

*(df=48, p-values with * is significant at 0.05 level of significance, Crit-t is 2.0106).*

Table 9: Relationship on the Respondents' Performance in the Simulated Learning Tasks and Evaluation on the Acceptability of the Designed Lesson Exemplar.

Group	Performance Level		Respondents' Evaluation	
Group 1 (Toss Coin)	4.5		3.48	
Group 2 (Tossing of Dice)	4.25		3.38	
Mean	4.28		3.43	
2-WAY ANOVA (Assuming unequal values of variances)				
Sources of Data	df	F-value	Critical-F	p-value
Performance and Evaluation of Group 1 vs. Group 2	1	5.4444	161.4476	0.2578
Performance vs. Evaluation	1	168.76	161.4476	0.04942
Decision	Not Significant		Significant	

The result of the computed difference on the level of performance between the 2 groups of respondents would mean that the designed lesson exemplar – integrating Biological concepts in teaching Mathematics could be qualified an effective instructional technique. Hence, the simulated learning tasks along this differentiated learning strategy are as well noted to yield high performance for both groups on students (based on performed learning task).

In relation the findings presented in this context of the study, Barsoum et al. [9] had revealed in their simulated context examination the same levels of understanding for students using the new text and students using a traditional text, indicating that reducing factual content and focusing on central themes is not detrimental to student outcomes related to content. They also found out that those students using the new text exhibited better retention of the content when surveyed several months later.

The group of Barsoum had compared the effects of two different learning texts in determining the difference on the students' performance, on the other hand, this study had only investigated variation on the respondents' learning performance on the simulated group activities in order to substantiate the objective of the designed lesson plan, however the researcher did not compare if such integration is as significant with the institutionalized learning approach or yet, may yield better effect on the learning competencies of the students. The study had also measured significant differences on the respondents' evaluation on the level of acceptability of the lesson exemplar. As such, **Table 7** reveals that almost all selected indicators for acceptability level (including the overall evaluations between the 2 set of respondents) except for the indicator along "mastery and delivery" showed no significant variations. The computed t values along these points of investigation are below the critical t value of 2.0106; and all computed *p-values* are higher than the level of significance at 0.05. Thus, this accepts an assumption of a null hypothesis – that there is no significant difference on the level of respondents' evaluation about the acceptability of the designed lesson strategy along the areas which shown no significant results. Still, this may mean that the respondents regardless of performed learning task gave the same level of assessment.

However, in terms of mastery and delivery (which pertains on how the teacher had presented the lesson exemplar among the set of respondents) was significantly differed between the 2 groups of respondents, which yielded a t- value of 2.9169 and *p-value* of 0.0362 which nullifies earlier hypothesis in this aspect. As shown with the computed mean rates between the 2 groups, those who performed the "toss coin" gave the higher evaluation at 3.58 over the other group who performed the "tossing of dice" showing the mean rate of 3.06. This would mean that group 1 perceived that the teacher had displayed exemplary mastery and delivery of the subject matter and learning objectives, and thus significantly regarded that the developed lesson plan is "much acceptable". Still, on the average rates of the respondents' evaluation, it had justified that both groups has the same point-of-view on the lesson's acceptability level.

Relationship of respondents' performance and evaluation

As justified in the statistical computation on the affectation of the groupings and selected variables of the study, it showed in **Table 8** that there exist a notable relationship on the respondents' performance on the simulated games and their evaluation on the presented lesson exemplar. This would then suggest that the curriculum or any lesson for that matter – a teacher should have to prioritize the competencies of the learners as to come-up with the best suitable and educative instructional strategies **(Table 9)**.

Conclusions and Recommendations

Benchmarking on the significant results of the study, the following conclusions were hereby identified.

1. The overall level of performance of the student-respondents in the simulated games is qualified as *"very satisfactory"*, from which respondents who performed the tossing of coins is higher being described as *"outstanding"* over the group who did the tossing of dice with the qualitative description of *"very satisfactory"*.

2. The designed lesson exemplar in Elementary Statistics (with specific topic on Frequency and Percentage Distribution, and Probability) with the integration of Biological concepts (Genotype and Phenotype) is collectively evaluated by the respondents as *"much agree"* and thus, being qualitatively interpreted as *"much acceptable"*.

3. Respondents' level of performance showed no significant variation between the 2 groups based on the performed learning task. Similarly, the overall evaluation on the level of acceptability

of the designed lesson exemplar also manifested no significant difference between the said groups of respondents. However, specific indicator for the level of acceptability along mastery and delivery showed significant difference, which the group of performing the "toss coin" gave significantly higher than the other group who performed the "tossing of coin".

4. Respondents' performance affects their evaluation on the presented lesson exemplar in elementary statistics, and thus, it is vital to note that students' learning competencies must be prioritized in designing educational/teaching strategies.

The following recommendations are being enumerated by the researcher based on the significant findings of the study, from which she deemed it but just logical to include considering the global implications of learning both Mathematics and Science.

1. Based on the discovery of Jungk [12] cited by Feser et al. [5], there is an opulent history of interdisciplinary work in mathematics and biology creating stimulating and occasionally unpredicted new knowledge and discoveries and thus, a differentiated learning strategy like the presented lesson exemplar in Elementary Statistics (integrating Biological concepts) may also instil considerable results in learning both concepts in Science and Mathematics.

2. Still, the researcher firmly believes that incorporating fun in the acquisition of learning is an effective instructional strategy in substantiating such technique of integration, contextualizing and localizing subject matters to be taught in any fields of knowledge – which simulation of local learning task like "gambling games" when used positively in the educational curricula, may as well yield positive results in teaching-learning process.

3. Future researchers may embark on the findings of this study in developing similar concepts of study in the future. Hence, the researcher is strongly recommending an experimental approach as to validate or negate the results presented in this study.

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