

USE OF E-BOOK IN SCIENCE LEARNING OF JUNIOR HIGH STUDENTS IN THE UNIVERSITY OF BATANGAS

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ABSTRACT

The Department of Education Order 105, s. 2009 stated that as this country advances through the 21st-century, the use of technology to research, organize, evaluate and communicate information has grown. In response to this, the use of E-book or Electronic Book is one of the 21st - century educational tools that provide opportunities to practice learning fundamentals in as many as possible. Moreover, this study aimed to assess the use of e-book as an instructional material in science learning among the junior high students of the University of Batangas, Batangas City, Philippines with the end purpose of developing activities that will enhance the teaching-learning process. It determined the usefulness of e-book in improving students' achievement, study habits and acquired skills including the common problems met by teachers and students in using an e-book. The descriptive method was used with a questionnaire as the main data gathering instrument with an interview. The respondents were composed of two groups, 40 Grade 10 students and 42 teachers are selected through purposive sampling. The statistical tools used were t-test and weighted mean. The results of the study revealed that teachers agreed that the content presents a series of activities in each section or unit, while students agreed that the contents have comprehensive and appropriate topics. The teachers agreed that the graphics use contrasting colors to the background for easy reading, while students agreed that it uses varying fonts and sizes. There are no significant differences between the assessment of teachers and students on the use of e-book as instructional material in learning Science in terms of contents, design, and graphics. The teachers and students agreed that e-book helps in enhancing student's achievement in the attainment of the content standard. The teachers agreed that students enhanced their acquired skills by demonstrating independent learning, while students agreed that their skills improved because they can transfer specific print-based reading skills to interactive. The common problems met by the respondents are the compatibility and design limitation of the software. The proposed activities have interactive visual features, varying fonts, sizes and color that can sustain the interest of the learners.

Keywords: Electronic Book, Descriptive Method, Instructional Material, Philippines, Technology, Software, and Independent Learning

INTRODUCTION

In the 21st century, universities all over the world must be at the forefront of embracing the opportunities brought about by new technologies

as well as understanding and overcoming their limitations. The great challenge to conventional print books is now apparent the twin



developments of digital text and the internet have brought about significant and rapid advances in all areas of our lives. All of us are now accustomed to writing and producing our documents electronically, communicating electronically, storing and retrieving information electronically, and, increasingly, accessing it anywhere on a wide range of devices. (Atkins, 2014). The University leaders and managers concern themselves with developments that align with institutions' strategic priorities, deliver competitive advantage, improve teaching and research performance, reduce costs and enhance value for money. The use of e-books has the potential to engage with all these strategic priorities. It is taking much longer than expected to arrive at a position in which e-books have a dominant and reliable part to play in students' learning and in universities' provision of texts to support both teaching and research. (Fyfe, 2014) On the other hand, in the Philippines, the Department of Education supports the idea of using e-books in the classroom as presented in a memorandum order 105, series of 2009 which stated that as this country advances through the 21st century, the use of technology to research, organize, evaluate and communicate information has grown. This is the main reason why schools, universities and other educational institutions integrated the use of E-book as an educational tool that can provide opportunities to practice learning fundamentals in as many ways as possible. It is widely used nowadays in different schools and institutions because the lessons were installed on the computer, laptop or tablet. It is from this end that the researchers were challenged to look into the extent to utilized e-books as an alternative instructional material and to know the impact of using e-book in students' acquired skills, study habits and achievement. The researchers chose this study because they wanted to assess the effectiveness of e-book as an alternative instructional material in teaching science and its usefulness to students' achievement and progress. Moreover, the researchers want to identify the problems met by the teacher and students in using the e-book to develop activities that can be used by the teachers and can

enhance science teaching. This research study is far different from the other studies because it can employ the effectiveness of using e-book in the development of science teaching and by providing alternative ways to properly utilize the use of e-book in addressing and solving issues and problems in the teaching-learning process. The findings of the study would serve as data in strengthening the science curriculum and instruction with technology integration as an innovative strategy to be employed by teachers in teaching the subject.

CONCEPTUAL FRAMEWORK

The exposure to technology devices and teaching strategies play an essential role in the teaching and learning process in the academe. This can determine the performance of the students in school. In Dale's cone of learning experience theory, the technology used in instruction. These are materials where delivery of instruction can be standardized. With computer technology, instruction can be made more interesting and the length of time required for instruction can be reduced and more importantly, the quality of learning can be improved. On the other hand, the Technological Pedagogical Content Knowledge (TPACK) theory serves as a framework for the integration of technology in education and how it can structure the classrooms to provide the best educational experience for students. This theory was developed to explain the set of knowledge that teachers need to teach the students about the subject, teach effectively and use technology. Generally, these theories influenced this research study in such a way that it focuses on the use of e-book in the teaching and learning process. The researchers achieved better performance of students if students can connect and relate to the lesson presented by the teachers. Therefore, there is a need to use motivation strategies, appropriate instructional materials, and intervention activities in one specific material. Similarly, the e-book is an educational material that can offer an interactive and engaging learning experience. To strengthen the understanding of the concepts presented, the

IPO model was adopted. The conceptual model presented a conceptual framework for undertaking and improving student's performance in the classroom learning situation. The concepts mentioned above and statements served as the bases for the research paradigm as presented in Figure 1. The input variables pertained to the descriptions in e-book as an instructional material used in science learning in terms of its content, design, and graphics. It also shows the usefulness of e-book in enhancing student's achievements, study habits, and acquired skills and even the common problems met by the teacher and students in using an e-book. The process box includes the assessment tools used as the survey questionnaire to gather responses from the two sets of respondents and conducted interviews done by the researchers. The output variable shows the set of activities to be proposed to enhance science teaching.

OBJECTIVES OF THE STUDY

The purpose of this study is to assess the importance of the use of the e-book to improve the science learning of junior high school students at the University of Batangas. Specific aims included the following: (1) to assess the e-book as an instructional material in science learning concerning its content, design, and graphics. (2) to identify the significant differences in using e-book compared to the use of textbooks. (3) to determine the common problems met by teachers and students in using e-book. (4) to develop a proposed activities to enhance the use of e-book in science lessons.

METHODOLOGY

This research study utilized a descriptive research design through questionnaires as the primary data gathering technique. For this purpose, the study used interview and questionnaires administered to the respondents. The data gathered were analyzed descriptively. The findings in this study used as the basis to developed activities to enhance the use of E-book in teaching and learning. This study involved 82 respondents. In the first group, the respondents composed of 42 faculty members who are using e-book in teaching. Since the number of participating faculty members involved in the study was few and therefore manageable, total population sampling technique used in the study. The second group was composed of 40 students who are achievers or the top ten students from four sections of Grade 10 science classes from Junior High School Department in University of Batangas. This study used purposive sampling in determining students' respondents. The survey questionnaire was the primary instrument used in the gathering of the needed data administered to the students and teachers as respondents. To substantiate the data gathered, the interview was also conducted to the respondents.

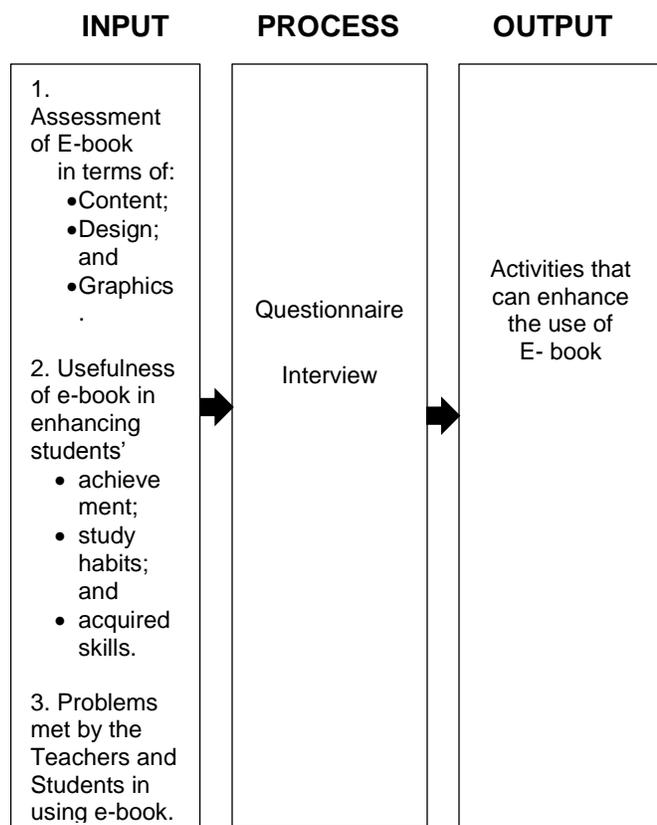


Figure 1. Research Paradigm

RESULTS AND DISCUSSION

1. The Assessment of e-book as an Instructional Material



1.1 Content

The teachers agreed that e-book contents have comprehensive and appropriate topics that obtained the weighted mean of 3.40 with a verbal interpretation of agree, this indicates that the topics and lessons aligned to the curriculum easily imparted to the students. The result finds support from the study of Bitter (2010) that among the features for selecting and integrating world-wide web resources was content. The content must clearly state, can be used for various learning styles and intelligence; information must be current and accurate. The students agreed that the content of the ebook covers all the topics necessary for understanding the subject. It obtained the lowest weighted mean of 3.13 and has a verbal interpretation of agree. This implies that the e-book that is currently using by the students does not show all the topics that must be learned by the students. This result is contradicting to the idea of Francisco (2012) that the content of the instructional materials should be the anchor to the national and local standard and benchmarks of the curriculum. The content should be based on the Philippine Secondary Learning Competencies. The author cited that choosing the instructional material in teaching requires a lot of thinking and decision making and must be clearly defined for the students to grasp. To sum up, the composite mean of 3.28 for teachers while 3.31 with both verbal interpretations of agree for students indicates that they both agreed that the contents of e-book were within the criteria set for evaluating its validity. The e-book design fitted for the needs, interest, and abilities of the learners, as well as for the teachers.

1.2 Design

As reflected on the table, the pages of e-book were easy to navigate as a teacher's perceived. This obtains the highest weighted mean of 3.95 with a verbal interpretation of agree. This implies that in terms of browsing the pages of an e-book, teachers did not experience difficulty on the compatibility of installed software.

Table 1. The Assessment of E-book in Terms of Design

Items	Teachers		Students	
	WM	VI	WM	VI
1. Has an introduction which provides the learners with insights of the lessons	3.48	A	3.28	A
2. Contains clear and comprehensive summary in each chapter	3.17	A	3.25	A
3. Layout is consistent and arranged logically	3.19	A	3.23	A
4. Non- text content (maps, graphs, picture) are accurate and well-integrated into the text	3.19	A	3.13	A
5. Easy to navigate the pages	3.95	A	2.98	A
6. Accessible lessons through hyperlink text in the table of contents	3.07	A	3.08	A
7. Contains engaging, interactive visuals features	3.12	A	3.10	A
Composite Mean	3.17	A	3.15	A

This finding conforms to the idea of Bitter (2010) that the different features for selecting and integrating world-wide web resources are content and the ease of use or navigation of ebook before incorporating in the teaching and learning process. In terms of student's response, they agreed that e-book has an introduction which provides the learners with insights of the lessons that obtained the highest weighted mean of 3.28 and verbal interpretation of agree. This indicates that the introduction of every lesson was crucial in giving on the part of the student by giving them an overview of every lesson. The respondents disclosed it during the interview that teaches a lesson on the e-book to provide students a simple introduction to helps them in studying as well as some definition of terms and guide questions. To sum up, the composite mean of the response of teacher was 3.17 while for students there were 3.15 with both verbal interpretations of agree. They both decided that the design of e-book met



the criteria and the presentation aligned to the interest and nature of learners to ensure the maximum participation during the teaching and learning process. These findings were similar to the statement of Guthrie and Wigfield (2008) that electronic book can appeal to multiple intelligences that contains text enhancement, such as definitions and background information while others offer illustrations that accompany the story.

1.3 Graphics

Table 2. The Assessment of E-book in Terms of Graphics

Items	Teachers		Students	
	WM	VI	WM	VI
1. Has neatly and clearly printed graphics	3.40	A	3.35	A
2. Sustains the attention and interest of the learners.	3.17	A	3.18	A
3. Appropriate for the level of understanding of the learners.	3.26	A	3.23	A
4. Has correct flow pattern of the teaching-learning process	3.31	A	3.35	A
5. Use varying fonts and sizes.	3.28	A	3.38	A
6. Use contrasting colors for easy reading.	3.52	SA	3.28	A
7. Has a format that is visually appealing and interesting.	3.40	A	3.35	A
Composite Mean	3.35	A	3.30	A

Based on the table, it could be noted that the teachers indicated that the graphics of e-books use contrasting colors for easy reading was strongly agree. These obtained the highest weighted mean of 3.52 with the verbal interpretation of agree. This implies that e-book can be used for a more extended period without straining the eyes of the readers. This result conforms to the idea of Rao (2011) that reading devices provide adjustable backlighting which enables e-book users to read comfortably in poor lighting conditions, even in bed at night. Use different fonts and sizes was agreed by the students that obtained the highest weighted mean of 3.38 with a verbal interpretation of agree. This implies that e-book has varying fonts and sizes which help students to adjust based on their

preferences. This conforms to the statement of Larson (2015) that ebook design is based on the suitability, objectivity, and usability of the learners, engaging process is fun due to ebook attractive features such as user-friendly functions, attractive graphics, enlarged text size and plug in speakers. These features would encourage student's creativity and learning autonomy. The composite mean of 3.35 with a verbal interpretation showed that the teachers were agreed in using the e-book as instructional materials in teaching Science. They know the importance of making use of varied strategies to fully attain the objectives of the lessons by using ebook. It could be individualized or web-based instruction, what is essential the pupils will master the concepts and acquire the skills. This affirms to Tejero's (2012) statement that the use of any ebook should determine the progress of every pupil influenced by their interest and learning ability.

2. The Differences Between the Assessments of Teachers and Students on E-book

Table 3. The Difference Between the Assessments of the Teachers and Students on E - book

Variable	t_0	p-value	Decision on H_0	Interpretation
Content	-0.304	0.762	Do not Reject	Not Significant
Design	0.195	0.846	Do not Reject	Not Significant
Graphics	0.483	0.631	Do not Reject	Not Significant

As shown in Table 3, the two groups of respondents had no significant differences in their appraisal of all of the indicators on the description of e-book relative to content, design, and graphics. This inference is sustained by the computed t-scores which were lesser than the tabular score of 1.9897 which corresponding 5 degrees of freedom at 0.05 level of significance. Thus, the null hypothesis is not rejected. Simply put, the teachers and students had a varied assessment on the contents, designs, and graphics as the components for the description of the e-book. Specifically, the two groups of



respondents had various appraisals on the contents of e-book based from the computed t-score of -0.304 which was lesser than the tabular t-score of 1.9897 with 5 degrees of freedom at 0.05 level of significance. Thus, the result shows that the null hypothesis is not rejected. This means that the teacher and students were not one in their view regarding contents. Seemingly, the teachers knew that e-book should be used to motivate students and provide them with a non-traditional learning situation. On the other hand, the teachers probably believe that e-book is a tool to achieve the learning contents of the subject area. The respondents also had a varied assessment in the description of the e-book in teaching relative to the graphics. This result supports the tabular t-value of 0.483 which was lesser than the computed t-value of 1.9897 with 5 degrees of freedom at 0.05 significance level. This means failed to reject the null hypothesis. It means that through the observations of the teachers they perceived that the design with the use of e-book in teaching is more on the application of the pupils on the things that they have learned. This is more on the concepts and ideas that teachers had imparted to their learners. On the other hand, teachers probably believed that students will be more compassionate and will have more desirable traits and at the same time will acquire the lessons thought by the teachers. These findings conform to the idea of Anuradha and Usha (2006) that e-book is presentable enough to capture the interest and motivates of the students that can be shown in its content and design that implies in the physical traits of the ebook to be more appealing to the learners and become useful for increasing the interaction between students and teachers.

3. The Usefulness of E-book in Enhancing Student's Achievement, Study Habits, and Acquired Skills

3.1 Achievement

Respondents agreed that e-book was moderately useful in the attainment of contents standard that obtained the highest weighted mean of 3.29 and 3.40 with the verbal

interpretation of moderately useful. This implies that both respondents believed that e-book helps in attaining the necessary knowledge and skills that the students need that can contribute to the wellness of the students. This result similar to the idea of Tejero (2012) that individualized instructions required especially prepared instructional and test materials, those materials are arranged in units so that the students can master the content with minimum help from the teacher. The lowest weighted mean of 2.83 with the verbal interpretation of moderately useful, the e-book was also moderately useful in making students more focus and concentration in studying. This implies that although e-book helps in studying, still some factors may affect the concentration of students while using the ebook. According to the student's response, e-book increases the chances of success in passing the exams and quizzes was moderately useful with a lowest weighted mean of 3.08 with the verbal interpretation of moderately useful. This implies that although ebook may help students to increase the chances of passing to teacher's evaluation, this might be depending on the effort of the students to study the lessons. This result was similar to the idea of Ferguson (2011) that performance was the level of the individual's work achievement that comes only after students had been exerted efforts. It depends not only on the amount of effort used but also on the individual's abilities and role perceptions. The statement "a student who uses an excellent amount of effort but has little knowledge of what inaccurately assessed may perform poorly" has composite means of 3.14 and 3.25 with both verbal interpretations of moderately useful indicated that teachers and students agreed that ebook was moderately useful in enhancing student's achievement. The respondents noted that they must know when and how to use technology to advance the purposes of education. The data conform to the study of Doyle (2010) that technological advances, scientific researches, and discoveries are essential to the students to cope with the rapid development in science. To improve the achievement of the students, teachers must use effective methods, strategies,



and approaches to facilitate the teaching-learning process.

3.2. Study Habits

Table 4. The Usefulness of e-book in Enhancing Student Study Habits

Items	Teachers		Students	
	WM	VI	WM	VI
1. Establishes good mood of studying lesson with the help of good graphics and design of ebook	3.05	MU	3.15	MU
2. Makes studying much more interesting through engaging, interactive visual features	3.12	MU	3.13	MU
3. Cope easily in the lesson through properly sequence topic	3.19	MU	3.23	MU
4. Manages the place in studying the lessons due to the accessibility to study materials anywhere	3.19	MU	3.45	MU
5. Uses free time to study because of the availability of Learning resources anytime	3.21	MU	3.13	MU
6. Review previous learning before new lessons are introduced	3.14	MU	3.20	MU
7. Finish the assignments on time through comprehensive and appropriate topics	3.07	MU	3.15	MU
8. Provides the ability to search for word or phrase that can be used in studying through hyperlink text	3.17	MU	3.23	MU
9. Engrosses student's willingness to study the lesson due to visually appealing and interesting format	3.07	MU	3.28	MU
10. Inspires in studying the lesson with the help of videos	3.12	MU	3.28	MU
Composite Mean	3.13	MU	3.22	MU

As assessed by the teacher respondents' e-book was moderately useful in the use of free time to study because of the availability of learning resources. This obtained the highest

weighted mean of 3.21 with the verbal interpretation of moderately useful. This indicates that students can study their lessons anytime because it is always available. This result conforms to the idea of Rao (2011) that e-books which are available online can be accessed 24/7. Also, more than one person may be able to access the same ebook at a time. Teachers agreed that e-book establishes the good mood of studying lesson with the help of good graphics and design was moderately useful and obtained the lowest weighted mean of 3.05 with the verbal interpretation of moderately useful. This implies that although e-book has some features, still it was not enough for the students to clench more in studying. The result was similar to the statement of Ingraham and Bradburn (2012) that e-book is merely an electronic book that serves the same purpose as a conventional printed book and may also share some of the looks and feel of a printed book. E-books may be enhanced with other electronic features such as embedded hyperlinks, bookmarks, annotation, text searching, and linking of the complex multimedia object may also be of great assistance for those with disabilities. The composite means of 3.13 and 3.22 with the verbal interpretation of moderately useful indicated that teachers and students considered e-book as moderately useful in enhancing students study habits. This helped the students develop good study habit, increase their reading habits and makes them read more books. Therefore, it is vital that the use of e-books should be encouraged students to help them develop good study habits and also to ensure lifelong learning. This finding conforms with the idea of Doiron (2011) that many youths are home with technologies, they adopt it as a way of life encouraging them to use ebooks will enhance their reading habits since they can download and read at their own pace.

3.3 Acquired Skills

Similarly, the e-book was moderately useful in investigating and search of information needed for the lesson and enhances comprehension through scaffolding experience with targeted strategy as revealed by teacher

respondents. This obtained a weighted mean of 3.29 with the verbal interpretation of moderately useful. This implies that according to the view of teachers, students gain the skills of researching the information they needed for their study. This result conforms to the idea of Moody (2010) that the digital scaffolds found in e-books provide additional opportunities for independent practice and interaction of a text, available even when an adult is not present. On the part of the responses of student respondents, they rated that e-book can transfer specific print-based reading skills to interactive was moderately useful. This obtained the highest weighted mean of 3.43 with the verbal interpretation of moderately useful. This may be attributed to the fact that the most important tool used to transfer knowledge and assess information and academic educational program is with the help of ebook. The students can share the information they gained into actions. This result supports the idea of Otnes (2013) that instructional materials answer the needs of the student's for realistic communication with others. These principles are based on the students' interest and needs for them to be able to think, interact, predict, interpret, analyze, and decide, from facts and not on mere opinions. Students agreed that e-book was moderately useful in strengthening verbal and written communications. To sum up, the composite mean of 3.18 and 3.28 with verbal interpretation of moderately useful revealed that ebook is moderately useful in helping the students to acquire some skills needed in the teaching-learning process. Through e-book, teachers were able to assess the individual performance of pupils in their class. The findings conform to the idea of Chau (2011) that e-book developed from constructivist principles should be appropriate, interactive, project-based and collaborative while providing students with many options or control over their learning.

4. The Common Problems met by the Respondents in Using E-book

As manifested in the table, teachers and students agreed that compatibility and design limitation of software was the most frequent

problems met in using ebook. This was justified by the highest weighted mean of 3.27 with the verbal interpretation of agree. This is an indication that some of the software of the gadget own by the students is not compatible with the software of e-book. The respondents revealed during the informal interview that they experienced technical problems regarding the downloaded e-book. However, not clear graphics with the lowest weighted mean of 2.85 with the verbal interpretation of the agreement was agreed to be the least problem meet by the respondents. This implies that the e-book that the respondents have a clear and good graphics. These findings conform to the idea of Larson (2015) that e-book has attractive features such as friendly functions and attractive graphics that makes it fun to use in studying. The composite mean of 3.11 with the verbal interpretation of agree revealed that the teachers agreed to all the problems met in the use of e-book as instructional materials. This implies that the teachers have always encountered problems in using the e-book because of lack of time in preparing instructional materials utilizing e-book. This finding supported the statement of Tezci (2011) that teachers should learn not only to know how to use technology to enhance traditional teaching or increase productivity but also should learn from a student-centered perspective how ICT can be integrated into classroom activities to promote student learning.

5. The Proposed Activities to Enhance the Use of the e-book in Teaching Science Lessons

The designed activities focused on enhancing the use of e-book in teaching science. Primarily, it was intended to help the teachers in Junior High School to make the discussion more interesting and informative. Also, the researchers considered some of the findings to the study such as lack of design, not visually appealing to students and insufficient activities in every lesson. The contents of the activities provide available materials within the e-books that were presented in each section or unit of the topic. It also enhances the higher cognitive skills of the

students by thinking critically on how to make the output of the activities presentable. Students can also use different fonts, sizes, and pictures as preferred by the students. In line with the findings, the researcher designed diversified learning activities which can provide instant feedback to encourage students to participate actively during the learning process to help master the skills and methods of collaborative learning. The diversified teaching activities such as comparing, doing puzzles, discovery, and presenting, which included assisting students in enhancing their interest in education, stimulating their thinking and reinforcing the effectiveness of teaching. The proposed activity is meaningful and ensures student development and advancement through the unit. Activities are built on previous activities and not repetitive; they enable students to engage with and develop their skills, knowledge, and understandings in different ways. Moreover activities engage students in active, constructive, intentional, authentic, and cooperative ways. Each activity has engaging, interactive features that the teachers to sustain the attention and interest of the students. The prepared activities covered all the topics necessary to understand the different lessons in Grade 10 science.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. Teachers and students agreed that e-book has a series of activities with comprehensive content and appropriate design and graphics for easy reading and navigation.
2. There are no significant differences between the assessment of teachers and students on the e-book as instructional materials in learning Science in terms of contents, design, and graphics.
3. Teachers and students agreed that e-book helps in enhancing student's achievement, study habits, and skills due to accessibility and interactive nature by improving the attainment of contents standard.

4. The common problems met by teachers and students in using e-book are compatibility and design limitation of the software.
5. The proposed activities have engaging and interactive visual features to help the students to master the skills and methods of collaborative learning.

RECOMMENDATIONS

In light of the findings and conclusions from this study, the following recommendations were endorsed.

1. The proposed activities may be presented to the Supervisor and Head of Science Department for their suggestions and comments after which they may be tried for the implementation by Science teachers.
2. The teachers handling Science may participate in ICT training to enhance their skills in using technology in classroom teaching.
3. There must be compatibility between the gadgets where the e-books will be installed with the e-book software.
4. Similar studies may be conducted regarding supplementary activities to validate the findings of the study further

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