

Effects of ADDIE Model on the Performance of B.E.E.D. Sophomore Students in the Project-Based Multimedia Learning Environment

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ABSTRACT:

This study was conducted to determine the effects of the ADDIE model as instructional design model on the performance of Bachelor of Elementary Education sophomore college students of Don Mariano Marcos Memorial State University- South La Union Campus through a project-based multimedia learning environment in Educational Technology course for the school year 2015 – 2016. A prepost- experimental method was conducted to gauge the performance of the respondents and descriptive survey was also used in their belief and perception in using ADDIE model to create multimedia projects in their subject. The results showed that the respondents' performance in Educational Technology has significant improvement. It was also found that the respondents have better teamwork, collaboration, motivation towards the project, and application of skills acquired with regards to their belief and attitudes towards ADDIE model. A significant relationship was found out with regards to their performance and their attitudes and perception, and their multiple intelligences. The evidence from this study suggests that ADDIE model weave in project-based multimedia learning environment is effective and efficient in enhancing the performance of would-be teachers.

Keywords: ADDIE Model, Project-based learning, multimedia, instructional design model, performance

INTRODUCTION

The world has changed. In an intensely competitive environment, nations with strong education systems and millions of highly educated, skilled workers and graduates roils markets every day. According to the World Bank, education can also be one of the strongest instruments for reducing poverty, there upon improving the well-being of the people, thus, proper investments must be made so as to achieve a quality education and a better nation. As such, Philippine education is said to be still in its way for development. As far as tertiary education especially in the field of teacher education and licensure examination are concerned, still the Philippines should make it up to be at par with other neighboring countries. In the Licensure Examination for elementary teachers alone from year 2010 to 2015, there has been more or less stagnant of passing rate wherein 15.44 for March 2010 and 19.58 for September 2010; in 2011 a rating of 15.81 and 22.68 were garnered; in 2012, 42.46 and 49.29 ratings were recorded to be the highest in 6 years; 27.78 and 31.18 were the passing rates in March and September LET 2013; in 2014, 28.98 and 35.74 were the passing rates and; 27.42 and 31.36 were the recorded national ratings for Licensure Examination for

Teachers in March and September 2015 for the Elementary Education category. These figures show that teacher education graduates have more or less achievement in the licensure examinations.

The poor achievement of graduates has incited educational researches worldwide to incessantly identify factors that affect classroom situation. Majority of research findings verified that the quality of teacher appears to be the most important factor influencing the performance of learners.

Former Education Secretary of Philippines, Florencio Abad, in Regpala (2010), mentioned that one of the main causes of problems on the low performance of learners is the unskilled teachers. The quality of teachers is indeed one of the contributory factors in the achievement of the learners in the different learning areas as verified by numerous researchers.

Other factors that affect the learners' achievement level include the teachers' background characteristics and classroom instructional practices (Kinami, Kara, & Njagi, 2013). According to Suzanne Wilson of Michigan State University, in Bryn (2013), more professional development for teachers is essential for meeting the next generation of educational standards. The role of schools, therefore, becomes a crucial factor to realize this end.

Today's technological age demands great transformation and innovations in the educational system. The demand for change in education is really at high fast-paced. With the new century, 21st century, children are facing challenges that the 19th and 20th centuries had not posed. Furthermore, teachers should not only prepare students' critical thinking, but also engage them in tasks that prepare them for this global citizenship. The same era is going to be faced by future teachers, those who are taking teacher education as a course. The shifting contemporary educational milieu has promoted the use of instructional design in the classroom in relation to a strategy. As far as teacher education is concerned, Don Mariano Marcos Memorial State University- South La Union Campus, being a Center of Excellence in Teacher Education Program, is not spared from this situation. It needs to adapt on the innovations and transformations in the educational system.

One of the high-time innovations in the educational system is on the use of an approach, the Project-based multimedia learning. This is an approach that envelops cooperative and collaborative techniques in a more rigorous but systematic process. Thus, it creates "self-managers" students. Research results on project-based learning are varied. Some results claim that this strategy is engaging while some dispels to be stressing for the teachers.

One of the most evident applications of Project-based multimedia learning approach in a teacher education program is on the fabrication of traditional and up-to-date materials thru thorough application of principles and laws governing the production, utilization and evaluation of materials which is manifested in "Educ 107- Educational Technology", one of the professional education courses in a teacher education program. This is where student teachers are trained to produce, utilize and evaluate instructional materials.

Based from Lucido and Borabo(2010), Educational Technology is a field study which is concerned with the field of maximizing educationalways and means for facilitating the learning process. This course is also a manifestation of one of the Objectives of the Bachelor of Elementary Education of Don Mariano Marcos Memorial State University – South La

Union Campus, “serve as a resource center for creative instructional technology and other academic concerns in the delivery of basic education”.

Of this course is an embedded topic on instructional design. That is to skillfully design instructional materials for the classroom and doing such needs a model to be used in the design. There are lots of instructional designs but an instructional design model known to be as ADDIE model is way getting attention in the world of education now.

The ADDIE model is an instructional design traditionally used with five phases—Analysis, Design, Development, Implementation, and Evaluation—which serve as a guide in a particular project and support engine in a particular task.

Realizing the potential usefulness of ADDIE model in instruction through a project-based multimedia approach, this research focused on the effects of this instructional design model on the performance of BEE sophomore students. The researcher hoped that this study will be deemed essential, relevant and responsive to the demands of highly competitive world and of the changing times of the dynamic teaching-learning process, most especially in educational technology to future teachers.

I. THEORETICAL FRAMEWORK

The following theories and concepts were used in the study: Learning Style, Multiple Intelligences, Dewey’s Practical Work, Kilpatrick’s Project Method and Cognitive Theory of Multimedia Learning. Learning style is the individual’s preferred ways of gaining, re-looping and embedding new ideas and skills.

Howard Gardner’ Multiple Intelligence was also used in the context as it posits human potential, not as a single dominating intelligence but as a whole in contact in particular.

Dewey’s Practical Work leads more into learning by doing or constructivism way where every student is an active participant in a particular task.

Kilpatrick’s Project Method posits that students learn better if their project was done wholeheartedly with force from the mentors.

Cognitive Theory of Multimedia Learning by Mayer assumes that learning is better if presented in a visual manner with words than only with words presented. However, this theory points out that learning does not happen merely by those visuals, rather it is upon the person to accept and reject information based from their needs and experiences.

These theories backed-up the different variables used in the study.

2. OBJECTIVES

The study determined the efficiency and effectiveness of ADDIE model as instructional design to the performance of Bachelor of Elementary Education sophomore students of Don Mariano Marcos Memorial State University- South La Union Campus in a project-based multimedia learning environment in Educational Technology course for the school year 2015 - 2016.

1. Determine the profile of BEE sophomore students of DMMMSU-SLUC as to their Learning style, and Multiple Intelligence.
2. Determine the BEE sophomore students' attitudes and perceptions towards ADDIE Model in developing a multimedia project
3. Determine the performance of BEE sophomore students when using ADDIE Model in the project-based multimedia environment
4. Determine the significant relationship on BEE sophomore students' attitudes and perceptions towards developing a multimedia project when group to their profile
5. Determine the significant relationship on the performance of BEE sophomore students when grouped according to profile and attitudes and perceptions towards ADDIE model in developing a multimedia project.

II. METHODOLOGY

This study made use of the descriptive survey and experimental research design to second year students of the Bachelor of Elementary Education with General Education Specialization of the College of Education of Don Mariano Marcos Memorial State University- South La Union Campus as the respondents. There are 107 second year students enrolled during the second semester of the Academic Year 2015-2016 with specialization in general education. Total enumeration is employed.

The instruments used to gather pertinent data in the study are the survey questionnaires and the assessment instrument on pre-test and post-test and sub pre-test-sub post-test in Educational Technology. The assessment test is validated by a pool of experts, pre-tested, and item analyzed. Frequency count, percent, and mean were used as common statistical tools. In determining if there was a significant difference between the sub-pre-test, post-test, pre-test and post-test, the t-test for dependent samples was applied using Statistical Package for Social Sciences (SPSS) version 20.

The Pearson r-moment of correlation was employed to determine the significant relationship in the performance of the BEE Sophomores when grouped according to profile and attitudes and perceptions towards ADDIE model in developing multimedia projects.

III. RESULTS AND DISCUSSION

Learning Styles of the Respondents

It can be gleaned from Table 1 that 33% of the respondents are group learners which imply that learning strategies or methods that focus on group activities fit better for them to be able to learn. This is in parallel to several studies which revealed that people are mostly extroverted (Keirsey and Bates, 1984).

Table 1. Profile of the Respondents in Terms of their Learning Styles

Descriptive Rating	Frequency Count	Percent
Individual	26	24%
Group	36	33%
Visual	9	9%
Auditory	12	11%
Tactile	8	8%
Kinesthetic	16	15%
Total	107	100%

Multiple Intelligences of the Respondents

Table 2. Profile of the Respondents in Terms of their Multiple Intelligences

Descriptive Rating	Frequency Count	Percent
Spatial	7	7%
Interpersonal	30	28%
Linguistic	8	8%
Naturalist	10	9%
Intrapersonal	28	26%
Musical	14	13%
Logical-Mathematical	7	7%
Bodily-Kinesthetic	3	2%
Total	107	100%

Table 2 summarizes the profile of the respondents in terms of their Multiple Intelligences. It can be seen that 28% has Interpersonal Intelligence which makes them adept at looking outward and figuring out other's feelings, motivation and insights. This implies that learning about others is a unique way of socialization of would-be teachers as their preparation for practice-teaching. Meanwhile, 2% has Bodily-Kinesthetic Intelligence which implies that would-be elementary teachers are not more on movements for them to learn.

Respondent's Attitudes and Perceptions towards ADDIE Model in Developing Multimedia Project

Table 3. Respondent's Attitudes and Perceptions towards ADDIE Model in Developing Multimedia Project

	Mean	Descriptive Rating
Motivation	4.20	VF
Students' Understanding of the Subject	4.28	VF
Students' Skills and Acquisition and Real-World Relevance	4.24	VF
Team Collaboration	4.30	VF
Team Dynamics	4.17	F

Legend: 4.20 - 5.00 - VF (Very Favorable) 1.80-2.59 - NF (Not Favorable)
 3.40-4.19 - F(Favorable) 1.79-1.00 - VU (Very Unfavorable)
 2.60-3.39 - U(Uncertain)

It can be seen from Table 3 that the respondent's attitude and perception towards ADDIE Model in developing multimedia projects are very favorable with regards to Motivation with weighted mean of 4.20; Students' Understanding of the Subject Domain with 4.28; Students' Skills and Acquisition and Real-World Relevance with 4.24; and Team Collaboration with 4.30 while team dynamics has a mean of 4.17 which signify a favorable attitude and perceptions. This indicates that majority of the respondents like the ADDIE model as instructional design in developing multimedia projects because this could have been an influence of their teachers and very easy to follow. This result was backed-up by Hull's Drive Reduction theory that suggests that drive is essential in order for responses to occur. For a project to be done well is to have a drive in which this case is on the respondent's attitude and perception towards ADDIE Model in developing multimedia projects and since they have a positive outlook on making projects then a turnout of better projects was evident.

Performance of BEE sophomores in the Pre-test and Post test

The performance of BEE Sophomore in the Pre-test is presented in Table 4. The equivalent grade in the Pre-test scores was used.

Table 4. Performance of BEE sophomores in the Pre-test and Post- test

	Mean	Descriptive Rating
Pre-test	64.98	Did Not Meet Expectations
Post- test	82.84	Satisfactory
Legend:	90% and above - Outstanding 80-84% - Satisfactory 74% and below - Did Not Meet Expectations	85- 89% - Very Satisfactory 75-79 % - Fairly Satisfactory

Table 4 above shows that the pre-test mean is 64.98 and with a standard deviation of 6.31. It reflects that the respondents during the pre-test garnered a descriptive rating of "Did Not Meet Expectations" which means that the respondents do not possess the minimum knowledge and skills and core understanding on Educational Technology. This implies that most of them have not acquired yet the minimal competencies set in the lesson. However, the pre-test serves as a diagnosis on what particular part of the lesson needs emphasis and deeper discussion.

It can be seen also in Table 4 that the computed mean of group's grade in the post-test is 82.84. Based from the descriptive rating, it shows that it had a proficiency of "Satisfactory" which means that the respondents meet the core requirements in terms of knowledge, skills and understanding on Educational Technology. These data also confirm the improvement of the performance of the students from the pre-test since the lessons have been taken prior to the conduct of the test.

Performance of BEE Sophomores in the Sub Pre-test and Sub Post- test

Table 5. Performance of BEE Sophomores in the SubPre-test and SubPost- test

Topics	Sub Pre-test	Sub Post- test	Mean	Descriptive Rating Mean	Descriptive Rating
Definition and History of Educational Technology		74.94	Did Not Meet Expectations	88.70	Very Satisfactory
Theories Associated with Educational Technology and Implication in the Classroom		79.13	Fairly Satisfactory	91.14	Outstanding
Print, Visual, Audio, and Video Media		70.31	Did Not Meet Expectations	91.14	Outstanding
Legend: 90% and above - Outstanding					85- 89% - Very Satisfactory
80-84%- Satisfactory					75-79 % - Fairly Satisfactory
74% and below - Did Not Meet Expectations					

This Table 5 reflects that the sub Pre-test Definition and History of Educational Technology is categorized to have a level of proficiency of “Did Not Meet Expectations”. This means that the respondents had no fundamental knowledge and skills about the topic. The sub post-test of the respondents on Definition and History of Educational Technology has a mean of 88.70 which means “Very Satisfactory”. This implies that the respondents had full understanding and skills on the topic and exceeded the required standard.

Since the topic on Theories Associated with Educational Technology and Implication in the Classroom is somewhat easy maybe due to some exposure of these theories in other professional education subjects then their sub post-test mean score has a level of proficiency of “Fairly Satisfactory”. This means that the respondents have acquired the minimum required skills and knowledge about the topic. Their sub post-test mean score has a level of proficiency of “Outstanding”. This means that the respondents have exceeded the required skills and knowledge about the topic.

Print, Visual, Audio, and Video Media has a proficiency level of “Did Not Meet Expectations” in the sub pre-test. This implies that the pupils have not adequately developed the fundamental knowledge, skills and core understanding on the topic. It can be noted that through the use of ADDIE in developing multimedia projects, the respondents in the post-test of print, visual, audio, and video media have acquired a level of proficiency of “Outstanding”. This implies that the respondents have exceeded the required skills and knowledge about the topic. It implies that most of the pupils. The comparison of the sub pre-test and sub post-test is aligned to Spiro, Feltovitch and Coulton’s Cognitive Flexibility theory which is largely concerned with transfer of knowledge and skills beyond their initial learning situation.

These data also confirm the improvement of the performance of the students from the sub pre-test since the lessons have already been taken prior to the conduct of the test. These

results show that the ADDIE model when used in developing multimedia projects enhanced the performance of the respondents in Educational Technology.

Differences in the Performance of the Respondents in Pre-test and Post-test

Table 6. Significant Differences between the Pre-test and Post- test of the Respondents

	Mean Difference	t-value	Sig(2-tailed)
Pre-test-Post- test	17.86	23.28**	0.000

**Significant at the 0.01 level (2-tailed)

Table 6 above shows the significant difference between the results of the Pre-test and Post-test whether there was an effect of ADDIE model in the performance of the BEE sophomore students of Don Mariano Marcos Memorial State University- South La Union Campus in a project-based multimedia learning environment in Educational Technology.

Based from Table 6, it can be inferred that computed t-value of 23.28 ($p < .01$) means that there was a significant difference in the Pre-test and Post- test scores in the performance of the respondents thru ADDIE model in developing multimedia projects. This implies that the use of ADDIE model was effective in enhancing the performance of the respondents

Differences in the Performance of the Respondents in Sub Pre-test and Sub Post- test

Table 7.Significant Differences between the Sub Pre-test and Sub Post- test Result

Topics	Mean Difference	t-value	Sig. (2-tailed)
Definition and History of Educational Technology	13.77	46.43**	0.000
Theories Associated with Educational Technology and Implication in the Classroom	12.02	45.79**	0.000
Print, Visual, Audio, and Video Media	20.83	25.78**	0.000

**Significant at 0.01 level(2-tailed)

Table 7 above shows the significant differences between the results of the sub Pre-tests and sub Post- tests whether there was an effect of ADDIE model in the performance of the BEE sophomore students of Don Mariano Marcos Memorial State University- South La Union Campus in a project-based multimedia learning environment in Educational Technology. The SPSS was used in computing for the t-ratio to test if there was a significant difference between the sub Pre-test and sub Post- test results.

Based from Table 7, it can be inferred that the computed t-values of the three sub Pre-tests- sub Post- tests are 46.43, 45.79 and 25.78, respectively($p < .01$) which means that there is a high significant difference between the sub Pre-tests and sub Post- tests scores which imply that the respondents performed better upon the use of ADDIE Model in a project-based multimedia learning environment.

Relationship between the Respondent's Profile and Attitudes and Perceptions towards ADDIE Model in Developing a Multimedia Project

Table 8. Test of Significant Relationship between the Respondent's Profile and Attitudes and Perceptions Towards ADDIE Model in Developing a Multimedia Project

Profile	Computed r value	Sig. (2-tailed)
Learning Style	.093	0.378
Multiple Intelligence	.230*	0.230

*Significant at 0.05 level(2-tailed)

Table 8 above presents also the Pearson-r value of .093 ($p>.05$) when respondent's attitude and perception is grouped with Learning Style. It can be noted that significant relationship does not exist in the attitudes and perceptions when grouped to the different type of learning style. This indicates that respondents with different learning styles have either more or less favorable or unfavorable attitudes or perceptions towards ADDIE model in developing a multimedia project.

It can be gleaned in the table that respondent's attitude and perception when grouped with Multiple Intelligences has the computed Pearson-r value of .230 ($p<.05$) which means that the significant relationship exists in the attitudes and perception when grouped to the different type of multiple intelligences. This means that the attitude and perception of the respondents in using ADDIE model in the development of multimedia projects have more or less positive or favorable response in relation to the different multiple intelligences and thus, a respondent with majority of interpersonal intelligence will have a more positive attitude and perception in using ADDIE model in the development of multimedia projects maybe due to an extrovert and outward thinking of the respondents as manifested by their intelligence. Thus, it implies that their view of ADDIE model or their attitude to it is a reflection of how multimedia projects were introduced and reinforced to them in their Educational technology subject.

Relationship in the Performance of the Respondents when grouped to their Profile and Attitudes and Perceptions towards ADDIE Model in developing a multimedia

Table 9. Test of Significant Relationship in the Performance of the Respondents when grouped to their Profile and Attitudes and Perceptions towards ADDIE Model in developing a multimedia

Profile	Computed r value	Sig. (2-tailed)
Learning Style	.092	0.385
Multiple Intelligence	.207*	0.046
Attitudes and Perception towards ADDIE Model in Developing a Multimedia Project	.678**	0.000

*Significant at 0.05 level(2-tailed)

** Significant at 0.01 level(2-tailed)

When grouped to Learning Style

Table 9 presents the significant relationship between the respondent's performance with a Pearson-r value of .092 ($p>.05$) when grouped to learning style. It can be noted that no significant relationship exist in the performance and the different learning style. This implies that regardless of the different learning styles that a respondent possess is more or less comparable with regard to performance in their Educational Technology subject using ADDIE model in the project-based multimedia learning environment.

When grouped to Multiple Intelligences

Table 9 above presents also the Pearson-re value of .207 ($p<.05$) when performance is grouped with Multiple Intelligence. It can be noted that significant relationship exist in the performance with different multiple intelligences. Thus, students with different multiple intelligences have different performance in using the ADDIE model. This indicates that respondents with interpersonal intelligences have capacity to perform better and respondents with Bodily-Kinesthetic Intelligences have lower capacity to perform. Thus, it implies that correct guidance and development of these innate gifts using an appropriate strategy in developing multimedia projects like ADDIE Model is necessary for students with intrapersonal intelligences.

When grouped to Attitudes and Perceptions towards ADDIE model in Developing a Multimedia Project

This study was also concerned with the respondents' attitude and perceptions towards ADDIE Model in developing a multimedia project with regards to the performance. This can be inferred from the computed value of Pearson-r in Table 9 which is .678 ($p< .01$) which implies that there is a strong significant relationship in the performance when the respondents were grouped according to attitudes and perceptions towards ADDIE Model in developing a multimedia project. This implies that the favorable or unfavorable attitude and perceptions of the respondents toward ADDIE Model in developing a multimedia project is a very strong determinant whether a respondent will have or will not have better performance. This means that a favorable attitude and perception will result to a better performance and vice-versa

IV. CONCLUSION

The performance of the respondents increased with a proficiency level of "Satisfactory" when ADDIE Model was introduced and used in the project-based learning environment. The respondents performed better in their sub Post- test than in their sub Pre-test. This indicates that when developing a multimedia project, instructional design like ADDIE Model can be used to guide for a better way of students to learn best. This affirms that student activities like multimedia projects shall continuously be provided so as to polish collaboration, creativity, curiosity and sense of adventurism that would lead to students' holistic development and not to deteriorate the good learning qualities of the students of the University. Furthermore, it would also be of help if the students train effectively to embed this in their field study.

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