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Addie Model of Instructional Effectiveness: Analyzing The Impact On Students Learning

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Abstract

The major objective was to analyze the impact of ADDIE model in terms of instructional effectiveness at university level. The present study employed quasi experimental design. The researcher planned lessons by following ADDIE model and taught the class. This tool's targeted sample was the entire Masters class (3rd semester of session 2020 to 2022). The researcher gave the class a pre-test before instructing it using the ADDIE model of instruction. After five weeks of instruction, researcher took the post-test for the class and compared the results of control group and experimental group with pre-test. To finish this complex process, researchers used data analysis strategies such as t-test, correlation between marks of pre-test and post-test of experimental group and control group, mean score and standard deviation using SPSS (version 19) and MS Excel. The analysis revealed a statistically significant difference between pre-test and post-test of both groups. Students of experimental group performed better than control group in the post-test, demonstrating that this instructional design model is effective for instruction and can produce better results. The present study recommends that this model may become effective for university teachers.

Keywords: ADDIE Model, Instructional Effectiveness, Students and Learning.

Introduction

Enhancing the effectiveness of instruction is a fundamental necessity and a societal demand. Instruction is defined as "Any deliberate effort aimed at facilitating learning" (Reigeluth et al., 2009). Instruction is also described as "Any intentional effort to improve learning by deliberately organizing events to help learners attain a desired enhancement in capability" (Smaldino et al., 2015). According to Rosenshine (2010) achieving excellence in instructional practice requires many years of experience and learning for a teacher. Well-organized instructional environments are imperative for learners to experience a sense of safety and support. Merely instructing students is insufficient; there should be ongoing exploration of measures to enhance instruction to meet both students' needs and societal demands. This concept is known as instructional effectiveness. Regarding instructional effectiveness, numerous educators and educationists have provided insights. Toland et al. (2015)

emphasized the effectiveness of instruction, examining it in terms of the delivery of lessons, the facilitator's role in teacher-learner interaction, and the teacher's role in fostering effective student learning. Effective instruction entails meticulous preparation of lectures and encourages students to engage in relevant activities based on their lessons. In the realm of effective teaching, educators establish high expectations for students' academic achievement and accordingly employ strategies to facilitate effective learning.

In addition to considering various factors, researchers must elucidate the principles of instructional effectiveness. Five principles of instructional effectiveness have been identified, as demonstrated by Khalil and Elkhider (2016). These principles can be implemented for effective teaching through a variety of delivery techniques. A fundamental principle involves incorporating problem-based studying and engaging learners in genuine real-world tasks. Effective teaching relies on presenting Intellectually stimulating, engaging, and relevant challenges that progressively increase in difficulty. The second principle centers on leveraging students' pre-existing knowledge as the foundational cornerstone upon which new information is constructed. Consequently, in the second phase, prior mental models or schemas are tapped into to harness previously acquired knowledge, thereby enhancing instructional effectiveness.

ADDIE model. ADDIE represents a behavioral methodology to instructional design that is simple to comprehend and useful for real-world application According to Watts et al. (2017), this approach offers a methodical framework for organizing and carrying out a learning experience. Every instructional strategy model must integrate the five critical steps of examination, planning, creation, execution, and assessment to ensure the delivery of successful teaching. These generally accepted phases—collectively referred to as ADDIE—have become a recognized instructional design paradigm.

Review of related literature

Instruction involves guiding learners in acquiring knowledge, understanding, skills, attitudes, appreciation, and values through consciously developed programs. The key focus is on directing the emergence of new knowledge that seamlessly integrates with existing background knowledge. This involves progressively engaging with new information through various approaches to foster formative and summative evaluations, ultimately enhancing competency in knowledge and understanding related to the subject matter. Instruction comprises a carefully organized series of actions encompassing presentations, practice, feedback, and assessment to assist students in attaining predefined learning objectives. It essentially involves the act of teaching students and subsequently obtaining feedback from them for evaluation. This conventional process may not adequately prepare a student to be beneficial in any future societal context. The researcher introduced the term "instructional effectiveness" to characterize the findings. In the realm of instructional effectiveness, attention is consistently directed toward the efficacy of teachers. This is because an increase in the efficiency of teachers corresponds to a heightened effectiveness in instruction. Research findings indicate that a teacher's confidence in their abilities is positively linked to their educational background, age, and professional experience, as demonstrated by Shazadi et al. (2011) and Phipps et al. (2013). In 2000, Darling-Hammond highlighted a strong and positive correlation between a teacher's accreditation status and a degree related to the subject and student achievement. Teacher efficacy is influenced by various factors, such as the teacher's degree, teaching style, student-teacher relations, and behavior. Among these, teaching experience emerges as the most crucial factor. Additionally, when accounting for a constant level of teacher quality, Rockoff (2004) demonstrated, that teaching capability exerted a noteworthy positive impact on learners' reading test presentation. Per Clotfelter et al. (2007), teachers' experience was identified as one of three elements fostering student development. Additionally, Tschannen-Moran and Hoy (2007) noted that the determinants of

self-efficacy differ among novice and seasoned educators. Bandura (1997) introduced active learning experiences, surrogate interactions, conversational impact, and physical stimulation as four catalysts for effectiveness in educators. In summary, these factors, along with numerous others, collectively contribute to instructional efficacy.

It's a common misconception that learning works best when it's necessary and expands on prior information and skills. As a result, students, not teachers, are responsible for genuine learning. Additionally, for the learning process to start, teachers are required. It doesn't matter if you are an instructor by nature with the ability to perform in front of a group or if you have to put in a lot of effort and overprepare to meet your goals. Conversely, the primary difference between teaching and other occupations is very clear. The majority of jobs that are accepted in society are content-driven. Success is achievable with sufficient topic knowledge, concept, execution, and delivery in addition to commitment and diligence. Even if those characteristics are important in the field of education, they are useless on their own without the added qualities of a pleasant disposition and interpersonal skills. As a result, having multiple talents and disciplines is essential for being a successful teacher. The fundamentals of good teaching are straightforward. They are as follows: A) mastery of the material; B) familiarity with and fondness for students; and C) awareness of one's own culture. While developing a teaching plan is not something we would suggest you do, you should be able to handle a range of classroom management techniques. The lessons and learning techniques listed below have garnered a lot of attention in the past ten years. Different formal models that center on the effective theory of instructional design have tried to distinguish different facets of training or instruction concerning instructional efficacy. A theory of instructional design includes a number of suggestions meant to help people learn and grow more successfully. Perceptual, spiritual, ethical, physiological, and divine developments are a few areas where learning is successful. Careful practice, insightful feedback, and strong intrinsic and extrinsic rewards should all be incorporated into instruction. The philosophy of instructional design, in contrast to other theories, emphasizes arrangement above justification. Secondly, it recommends suitable and unsuitable instructional strategies. Thirdly, entire instructional model theories let educators dissect instructional tactics into more detailed component procedures. Fourthly, the strategies are contingent rather than predictable, signifying their contribution to success. In conclusion, instructional design theories concentrate on design, clarifying instructional methods and the circumstances in which particular strategies should be utilized. These procedures can be subdivided to improve the reliability of the techniques.

ADDIE Model

The ADDIE model is an instructional paradigm that is generally effective. It includes ways to assist users in producing instructional content for a range of educational settings. This paradigm serves as a flexible and dynamic foundation for the creation of excellent instructional materials. The phases of the ADDIE model— examination, planning, creation, execution, and assessment —act as a road map for the full design process. It starts with identifying the material that needs to be learned and ends with evaluating if the desired learning outcomes were met. The creator obtains an absolute grasp of the divergence concerning the desired results and the apprentices' current knowledge and skills during the analysis phase. Design and development are two separate but equally important stages in the ADDIE process. Instructional goals, particular learning objectives, curriculum content, delivery strategies, practice exercises, assessment standards, pedagogical approaches, mainstream media, and analyses are all documented throughout the design process. It's commonly acknowledged that the development stage is quite important. As an outcome, the design process may be disregarded, given less consideration, or even ignored entirely because program planning is preferred. On the other hand, thorough planning can greatly reduce the amount of time needed to create educational content. After the analysis stage, the design step creates an educational program plan by incorporating the

knowledge discovered during the analysis. This guarantees that all schooling is in line with basic requirements and that staff members have the knowledge and abilities needed to do their jobs well.

The development stage comes next. During this phase, the teacher develops assignments, tests, and learning resources. During this phase, decisions are also made about the usage of technology to improve teaching and learning. For example, storyboards are used to make the creation of a training program easier. Student participation in the classroom, teacher preparation, and prototype testing are all part of the implementation phase. The evaluation phase comes last, with assessment being the last stage. Both formative and summative evaluations are included in this phase. Summative analysis is the process of measuring learning outcomes after instruction has ended, whereas formative assessment involves analyzing learning outcomes while instruction is still in progress. The ADDIE model's figure is shown below.

After an extensive examination of several instructional efficacy models, the most popular instructional design approach is the ADDIE model. It has a simple structure and is very understandable. When it comes to helping educators with a variety of instructional design skills create instructional materials more quickly, the ADDIE model is a useful tool. As a result, the researcher decided to evaluate the ADDIE model of instruction's effects on students in higher education.

Objectives of the Study

This study project intends to achieve the following goals:

- To evaluate how the ADDIE model affects university students' learning.
- To determine efficient teaching techniques that optimizes the efficacy of university-level classroom education.
- To research effective methods for implementing lessons to enhance university instruction.
- To investigate how students view the ADDIE model of educational efficacy.

Hypotheses

- Hypothesis 1: It is hypothesized that ADDIE model of instructional effectiveness has significant effect on students' learning at university level.
- Hypothesis 2: It is hypothesized that phases of ADDIE model (Analysis, Design, Development, Implementation and Evaluation) will have positive impact on students' learning at university level.
- Hypothesis 3: It is hypothesized that there is no difference in student achievement between experimental group and control group.
- Hypothesis 4: It is hypothesized that there is positive relationship between the scores of experimental group and control group.
- Hypothesis 5: It is hypothesized that students of both groups will get not good marks in pre-test.
- Hypothesis 6: It is hypothesized that students of experimental group will show better results in post-test.

Research Methodology

Table 1: Brief summary of research methodology

Tool	Sample	Tool's detail	Total planned lessons	Students involved in the study	Ratio of male and female	Total Sample
Pre-test and post-test for students (from course outline of subject, methods and techniques of teaching)	3 rd semester of MA Education (session 2020-22) of Education department	Structured Items	5 weeks: 27 lessons were planned by following ADDIE model and were delivered to students	An experimental group of 17 students of 3 rd semester of MA Education	08 males (4 males for experimental group and 4 males for control group) and 26 females (13 females for experimental group and 13 females for control group)	34 Students

Data Collection Process

This study utilized an instrument: test (01 pre-test, 01 post-test, can be accessed by the researchers) to evaluate the effect of the ADDIE model on learning of students at university level. The selected tool was an experimental investigation that included both experimental and control groups. The experimental group consisted of 14 student respondents, while the control group comprised 20 participants. The researcher delivered instructions to the control group in a master's class and noted the outcomes of both experimental and control sets. A pre-test was conducted to assess the mental abilities of the class, followed by the planning of lessons plans for every topic utilizing the ADDIE model. To improve outcomes, the researcher utilized a range of teaching strategies in the experimental grouping. Diverse methods and strategies grounded in the ADDIE model were applied for each topic, with daily assessments of students. After the 5-week (27 lesson planned and delivered) experimental research, the investigator assessed students in each of the groups, and the results of post-test were contrasted with pre-test. The pre-test for pupils took place on the 28th of March 2022, and after the teaching of 5-week, the post-test for all two of the groups occurred on the 2nd of May 2022 (lists of control and experimental groups are maintained).

Data Analyses

Mean, Standard deviation, correlation, and t-test for pre- test and post-test (paired) between the two groups were computed. The subsequent section provides the interpretation of the analyses for the tool.

Pre-test and Post-test of students

The table 2 below illustrates the mean values for both the post-test and the pre-test. Statistics shows for paired samples, including the calculated mean values for both of the tests. The score for pre-test means stood at 9.15, whereas the score for post-test mean was 9.18, indicating slight variations in mean values between the two tests.

Table 2: The average performance of participants concerning both pre-test and post-test.

Pair 1	N	SD	Mean
Marks: Pre-test	34	2.363	9.15
Marks: Post-test	34	4.441	9.18

Table 3 displays the correlation involving the pre-test and post-test, where 'r' represents the correlation. The coefficient for correlation spans from -1 to +1, signifying the direction, form, and strength of a relationship. In this case, the relationship between pre-test and post-test student answers was $r=0.428$, indicating a nearly moderate correlation between the two assessments. A positive correlation indicates that both variables (pre-test and post-test) are moving in the similar direction.

Table 3: The correlation among pupils' scores in the pre-test and post-test.

Pair 1	N	Sig.	Correlation
Marks: Pre-test Marks: Post-test	34	.012	.428

Table 4 shows the differences of response of control group and experimental group. mean value of experimental group was 9.18 while the mean value of control group was 9.00 in pre-test. This was a minimal difference. While the mean value of experimental group was 11.93 and the mean value of control group was 9.43 in post-test. The mean score of experimental groups is greater than the mean score of control group. It shows better performance of experimental group.

Difference of responses of experimental group and control group

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
pre_test_score	Experimental group	17	9.18	1.704	.413
	Control group	17	9.00	2.937	.712
post_test_score	Experimental group	15	11.93	1.792	.463
	Control group	14	9.43	2.277	.609

Table 5 shows the difference of responses between two tests. A p value expresses the observed

results when the null hypothesis is assumed to be correct. As the p-value decreases, so does the statistical significance of the observed difference increases. Value of 0.05 or less is generally considered statistically significant, a p-value of .966 is greater than 0.05 and thus difference is non-significant.

Table 5: Difference of responses of students in pre-test and post-test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Marks Pre-test & Marks Post-test	-.029	4.041	.693	-1.440	1.381	-.042	33	.966

Table 6 shows the values of t-test of experimental group and control group which is 3.304 and of 3.276 respectively. Difference exists between experimental group and control group as the t-test value of experimental group is greater than the t-test value of control group. It shows better performance of experimental group. Mean difference of pre-test is .176 and for post-test are 2.505. Standard error difference of pre-test is 0.824 and of post-test is .758 but not assumed equal variance is .764.

Table 6: Differences of performance between experimental group and control group

	F	Sig.	t	df	Sig (2-tailed)	Mean difference	Std. error difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
Pre-test scores (Equal variances assumed)	3.533	0.069	.214	32	.832	.176	.824	-1.501	1.854
Pre-test scores (Equal variances not assumed)			.214	25.67	.832	.176	.824	-1.517	1.870
Post-test scores (Equal variances assumed)	0.501	0.4849	3.304	27	.003	2.505	.758	.949	4.060
Post-test scores (Equal variances not assumed)			3.276	24.70	.003	2.505	.764	.929	4.080

level of significance= 0.05

Results

Beginning with an overview of the pre-test and post-test results. The average value for the pre-test was 9.15, while the average value for the post-test was 9.18, indicating a slight difference in the mean values of both tests. Regarding the correlation value, the correlation between students' pre-test and post-test responses was $r=0.428$, indicating an almost reasonable correlation between the two assessments. The pre-test and post-test variables appear to be heading in the same direction based on the positive correlation. The differences between the two tests were subsequently determined. As the p-value declines, the observed difference's significance increases. In general, a p-value of less than 0.05 is regarded as highly significant. The investigator calculated a p-value of 0.966 in the present case, which is higher than 0.05 and denotes non-significance.

After the implementation of model and effective strategies used according to model, students showed somehow better performance in post-test. This indicates that ADDIE model of instructional effectiveness has significant effect on students' learning and all phases of ADDIE model have positive impact on students' learning at university level.

After reviewing the experiment and instrument, the researcher concluded that university students can learn well by utilizing the ADDIE model of instructional efficacy as a whole. The use of this paradigm is straightforward and well-organized. By taking part in a variety of engaging activities that are tailored to the lesson based on this model, students were more engaged in the instruction. The evaluation stage is essential for every stage. Because students were nervous about being graded, students put a lot of effort into their academic performance. Consequently, this model demonstrated complete efficiency.

Conclusion

Findings and results indicated that the ADDIE model has impacted students learning at university level as the found values of experimental group were greater as compared to control group and the difference of responses and performance was significant. It can be concluded that students did better in post-test which is evident that the ADDIE model of instructional effectiveness has a major influence on student learning and it had positively impacted through its different phases.

Recommendations

By keeping in view, the findings and results of the present study, it is recommended that the model ADDIE may be implemented by all university teachers for the teaching of almost all subjects.

It should also be included in the curriculum of teacher education especially in the subject of methods and techniques of teaching.

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