

Using ADDIE Model for Scaffolded Learning and Teaching Intervention

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Abstract: Learning and Teaching (L&T) research is sometimes challenging for lecturers who are not specialists in the Scholarship of Teaching and Learning (SoTL) or instructional design. Good empirical L&T research should be reflective, based on a sound theoretical foundation, and completed like other research, using appropriate steps in data collection. Many L&T researchers often skip to the intervention or implementation without embedding evidence and proper research steps in the project from the beginning. This study aimed to explore the integration of the ADDIE model with L&T interventions incorporating pedagogical theory. It also aimed to examine how the findings from implementing this model in SoTL projects can inform best practices for instructional design and contribute to the broader scholarship on teaching and learning. The study adopted a mixed-method approach with a pre-post-test design. A collaborative interventive research project was purposively selected, focusing on First Year, Senior, and Further Education and Training (SEN&FET) Bachelor of Education students who are trained to teach grades 8-12. The results confirmed the efficacy of the ADDIE model steps as

a useful instructional design framework for integrating L&T theories. The study also found that a scaffolded L&T collaborative intervention with sound research methodologies and approaches is beneficial for SoTL projects. Therefore, the study recommends implementing the ADDIE model in different interventive approaches and collaborative educational settings to enhance students' achievement as well as teaching and learning.

Keywords: ADDIE, SoTL, learning and teaching, scaffolding, collaborative intervention.

1. Introduction

In the ever-evolving landscape of education, the pursuit of effective Learning and Teaching (LT) strategies is crucial. As the paradigm shifts, educators are taking on a facilitative and coordinating role, guiding students towards achievement. This shift signifies the presence of learning environments prioritising collaboration and cooperation, aiming to create interactive and engaging educational spaces (Mhlongo et al., 2023). At any educational institution, instructional practitioners are responsible for using teaching methods that positively impact students' learning approaches, fostering a deep approach to learning (Mladenovici et al., 2021).

As LT evolves to meet changing demands, it becomes essential to merge pedagogical innovation with research, taking a holistic approach that goes beyond traditional boundaries. However, this can be a challenge for educators who are not specialists in the Scholarship of Teaching and Learning (SoTL) or instructional design. As Kensington-Miller et al. (2021) explain, the SoTL landscape is complex and diverse, requiring navigation across different disciplines, methods, positions, and ways of knowing. Empirical L&T research must strike a balance between theoretical foundations and research methodologies to generate meaningful insights in learning and teaching. These insights must be grounded in theory and applicable in practice, contributing to the improvement of educational practices and outcomes (Dousay & Stefaniak, 2023). However, many LT researchers rush to implement interventions, often overlooking the importance of establishing a strong evidential base

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from the start of the project. Several leading researchers in research-oriented teaching openly admit that initial activities in implementation research did not yield the desired outcomes, with many encountering difficulties that tested their determination (National Research Council, 2015).

The foundation of this study is based on the recognition that education is a dynamic field requiring adaptable and evidence-based practices. Numerous studies have explored the use of the ADDIE model in different learning and teaching contexts. These studies have examined its application and emphasised its role in promoting learner-centred pedagogy (Basu, 2018; Adriani et al., 2020; Ahmed, 2022). However, there is limited literature on using the ADDIE model for scaffolded theoretical-based learning and teaching interventions incorporated into a mixed-method research approach. By integrating Vygotsky's theories, such as the Zone of Proximal Development and Scaffolding, into the ADDIE model with sound methodologies, educators can better meet the diverse needs of learners (Sahaat et al., 2020).

The ADDIE model was an ideal instructional design framework for this study because it provided a systematic process for designing and implementing educational interventions (Basu, 2018; Hess & Greer, 2016). A mixed methods strategy was employed to customise the intervention within the ADDIE model's steps. A scaffolded collaborative intervention was used to provide structured support and guidance to learners, gradually reducing it as they become more proficient. This approach aligns with the principles of instructional design, which recognise the value of individual variability in learning preferences and capacities.

Therefore, this study positions itself as a Scholarship of Teaching and Learning (SoTL) project, emphasising a commitment to advancing both the practice and theory of teaching. By incorporating sound research methodologies and approaches, the project aims to contribute valuable insights into the effectiveness of integrating the ADDIE model with various learning and teaching theories. The study serves as a bridge between educational research and classroom practice, with the intention of enhancing the overall quality of the teaching and learning experience.

1.1 Problem statement

In the dynamic field of education, the pursuit of effective learning and teaching (L&T) strategies is essential to ensure meaningful learning outcomes for students. The need for comprehensive frameworks that successfully incorporate educational ideas highlights the importance of improving learning and teaching experiences. As instructional practitioners (educators, lecturers, etc.) increasingly take on facilitative roles, emphasising collaboration and cooperation in learning environments (Mhlongo et al., 2023), there is a need to examine the integration of pedagogical innovation with research to enhance educational practices. However, the complexity of the Scholarship of Teaching and Learning (SoTL) landscape, along with the challenge of balancing theoretical foundations with rigorous methodologies, poses significant difficulties, especially for those without specialised knowledge in instructional design (Webb & Tierney, 2019; Godbold et al., 2024). Limited research has been conducted on the application of the ADDIE model for a scaffolded, theoretically-based learning and teaching intervention integrated into a mixed-method research approach, although numerous studies have explored its use in various L&T contexts and highlighted its role in promoting learner-centred pedagogy (Basu, 2017; Sunaryo, 2018; Ahmed, 2022; Lestari, 2023; Mildayanti, 2024). Therefore, this study aims to integrate the ADDIE model, a systematic instructional design framework, with an L&T theory, Vygotsky's Zone of Proximal Development, and the concept of scaffolding in a collaborative intervention tailored to diverse student needs.

1.2 Research questions

The questions that guided the study are as outlined below:

- How can the ADDIE model be integrated with L&T interventions that integrate a pedagogical theory?

- How can the implementation of the ADDIE model in SoTL projects inform best practices in instructional design and enhance the scholarship of teaching and learning in higher education?

2. Theoretical Framework

This study is underpinned by Vygotsky Zone of proximal development and scaffolding and Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Model.

2.1 Lev Vygotsky Zone of proximal development and scaffolding

One of the most important and well-known ideas of social constructivism pioneer Lev Vygotsky is the Zone of Proximal Development (ZPD) (Taber, 2020). According to Vygotsky (1978), the ZPD is the gap between a child's current level of development, determined through independent problem-solving, and their potential development, which can be achieved through collaboration with more experienced peers or guidance from adults. In other words, the ZPD suggests that learning new knowledge or skills may require support from someone who knows more than the learner. The Writing Centre helps students by first assessing their prior knowledge from secondary school to determine their Zone of Proximal Development (ZPD), which represents the range of abilities they can develop with guidance. Through a series of consultations, the Centre provides support using a scaffolding approach. This means that they gradually adjust the level of assistance, initially providing more help and then gradually reducing it as the student becomes more confident and capable. This method guides students step by step until they can independently complete a final draft.

Recognising the crucial role of social interaction with qualified tutors in the learning process, Vygotsky and other educational experts advocate for education to focus on providing experiences within a child's Zone of Proximal Development (ZPD) to support and enhance individual learning (Berk & Winsler, 1995; Vygotsky, 1978). While "scaffolding" and the ZPD concept are often used interchangeably in literature, Stone (1998) points out that it is important to acknowledge that Vygotsky never used the term "scaffolding." Wood, Bruner, and Ross (1976) explain that the term describes a process that assists a child or novice in achieving a task or goal that they cannot accomplish on their own. Similar to removing scaffolding from a structure once construction is complete, scaffolding involves supporting a student within their Zone of Proximal Development (ZPD) and gradually reducing assistance as the learner becomes more proficient (Balaban, 1995). To provide this assistance, an adult initially manages parts of the work that exceed the learner's capacity, allowing them to focus on tasks within their skill level (Wood et al., 1976). According to Vygotsky's theory, the ZPD is the area between a learner's "actual developmental level" and "potential developmental level" (Vygotsky, 1978, p. 86). In the context of the Writing Centre, scaffolding refers to tutors addressing the more challenging aspects of academic writing that are beyond the student's ZPD. This enables students to concentrate on assignments within their abilities and gradually improve their skills and confidence. As the student progresses and gains experience, the tutor provides less and less assistance, allowing the student to transition from rough drafts to a final, polished piece of writing.

The ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) further structures this theoretical framework. The writing centre systematically assists students in improving their academic writing by analysing their prior knowledge and skills, designing appropriate interventions, developing instructional materials, implementing the interventions, and evaluating their effectiveness. Therefore, the ADDIE model and the university writing centre are based on this theoretical framework, which emphasises the scaffolding process to help students transition from incompetence to proficiency in their Zone of Proximal Development (ZPD) for scholarly writing.

2.2 The analysis, design, development, implementation, and evaluation (ADDIE) model

The ADDIE model was incorporated to support the stages in the progress of the collaborative research project. The model is outlined in Figure 1 below.



Figure 1. The ADDIE Model

The "Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Instructional Design (ID)" framework was used to support the methodology of the study (Hess & Greer, 2016, p. 11). According to Hess and Greer (2016), this framework was developed by Instructional Design (ID) academics to facilitate successful learning interactions. They further explain that the ID scholars drew on principles from Merrill (2002), Dick and Carey's systems approach (1985), and Kirkpatrick's evaluation model (1994) to provide comprehensive guidelines for creating and measuring learning. According to Hess and Greer (2016, p. 11) and Branch (2009), the steps are listed below, and the data-collecting instruments clarify the incorporation.

- "Analysing a learning situation,"
- "Designing objectives and principles to address the issues in the learning situation,"
- "Developing resources to meet these specifications,"
- "Implementing the learning resources in the learning situation," and
- "Evaluating how these resources addressed instructional needs."

3. Research Methodology

The study employed a mixed methods research approach and a case study design to integrate the ADDIE model in this Learning and Teaching (L&T) collaborative intervention, which focused on the academic writing skills of First Year, Senior, and Further Education and Training (SEN&FET) Bachelor of Education students trained to teach grades 8-12. The sample was purposively selected, comprising a population of 550 students, with 108 forming an experimental group and another 108 as a control group. Data collection followed the pre-post-test design, including the pre-test and post-test scores of the essay assignment given to the students, seven marker's comments, a writing centre student visitation report, and a Google Form survey. The ADDIE model guided the pre-post-test process through its stages. The section below elaborates in detail.

3.1 Research approach

The study utilised a convergent mixed methods research approach, which involves the collection of both quantitative and qualitative data simultaneously and their integration during the interpretation of the results (Hafsa, 2019; O'Donoghue & Farrelly, 2022). This approach allowed the researcher to gather data from multiple sources (Foster, 2024) in order to achieve the study objectives. By adopting the mixed methods approach, the researcher was able to collect qualitative data from the marker's comments, as well as quantitative data from the pre-posttest scores and the Google form survey. Consequently, this research approach provided a deeper understanding of the study objectives.

3.2 Research design

The study used a case study design, which is a methodical research technique that produces a comprehensive understanding of a problem. It involves examining a person, group, or event to comprehend a phenomenon that occurs in real life (Coombs, 2022). A collaborative intervention project for first-year student teachers, in which the ADDIE model was incorporated, was adopted as a case to examine the phenomena of academic writing challenges of 550 Sen & FET when joining the university in one South African university as their natural setting (Yin, 2018). The ADDIE model was integrated to guide the research study project, providing a systematic framework to enhance the rigour and comprehensiveness of the research process (Hess & Greer, 2016).

3.3 Population and sample

The study used purposive sampling to select a sample from a population, with a population defined as the entire collection of units that have the variable features that are the subject of the study and to which the results of the research can be applied or generalised (Shukla, 2020). The population was Senior and Further Education and Training (SEN&FET) first-year students, registered for a Bachelor of Education and trained to teach grades 8, 9, 10, 11, and 12, who were part of an academic writing L&T interventive collaborative project in one South African university. The population consisted of five hundred and fifty (N=550) students who took part in the collaborative intervention project, in which the pre-posttest was employed. The project incorporated the ADDIE model in the intervention methodological process.

The sample selected from the five hundred and fifty (N=550), as established by Hoeber et al. (2017), is chosen with consideration, given its relevance to the phenomenon under study. The sample for this study comprised a total of two hundred and sixteen (N=216) students, including one hundred and eight (N=108) students who attended the writing centre and one hundred and eight (N=108) students who did not attend the writing centre. The writing centre is established at the university to assist students with academic writing on the various assessments they are expected to participate in. The 108 students who went to the writing centre were considered the experimental group, while 108 students from the group who did not visit the centre were considered the control group. Additionally, out of the 216 students, fifty (N=50) students who responded to the Google Form were also used as a sample. Seven markers' comments, which is the total number of markers for the whole population, with pseudonyms to conceal their identity (Marker 1, Marker 2, Marker 3, Marker 4, Marker 5, Marker 6, and Marker 7), were selected as part of the study's sample.

3.4 Data collection instruments

Data was collected in a pre-post-test design. Pre-post-test is a design where two groups are involved, with one group receiving the treatment (experiential group) while the other group is not given any treatment (control group). However, both groups were subjected to the same tests within the same period, and the results were deduced based on both groups (Shuttleworth, 2018). The students submitted an initial essay without help from the writing centre (pretest). For the posttest, students received assistance from the writing centre. Marking with feedback and grading used the same rubric

for both pre and post-tests. The control group received no help, while the experimental group received guidance. The data collection process incorporated the stages of the ADDIE model as outlined below:

ADDIE Model - Phase 1 Data Collection: Stage 1 - Analysis: Based on the analysis stage of the ADDIE model, the first phase of the research project was an essay assignment given as a pre-test assessment to diagnose the academic challenges that SEN&FET phase First-Year students experience in their entry-level year at university. The assessment included various language conventions and basic academic writing expectations as requirements. The students were given the rubric for the assessment beforehand to understand the marking process. At this stage, the lecturer, in collaboration with the writing centre, provided clear instructions for the students to write the essay assignment independently and consider the marking guidelines of the rubric without any assistance from the writing centre. A link to the university's learning management system (Blackboard) was created so that students could submit their first drafts. The lecturer started the marking process with the assistance of seven (7) markers, four (4) of whom were academic writing assistants at the writing centre. The marker's qualitative comments and the student's quantitative scores were used to diagnose the student's academic writing skill level.

ADDIE Model - Phase 2 Data Collection: Stages 2,3 and 4 - Design, Develop and Implement: In this phase, the three stages of the ADDIE model - "design, develop, and implement" - were incorporated together to intertwine the intervention process. A post-test assessment in the same essay assignment format, with the same content, was given to the students. The same assessment rubric as the pre-test was given to the students. The difference with the post-test design was the intervention of the writing centre. The students were given instructions on how to approach the writing centre for their first draft essay assignment. The writing centre booked sessions for each student or group of students who made appointments with the writing centre. The writing centre intervened to assist the students with refining their first draft essay assignments in preparation for final draft submission. Using the Zone of Proximal Development concept and a scaffolded approach, the writing centre enabled students to schedule different sessions based on their level of help needs. This method served as the theoretical framework for the joint intervention project. The scaffolded approach employed by the writing centre applied a back-and-forth collaboration with the students, as the students were taken through their first drafts and shown where they may have moved away from what was required. The students would go back and rewrite their assignments and return to the writing centre for another review session. The session booking was, therefore, performed in cycles until the student was ready to submit. After the deadline for the submission of the final drafts, the lecturer and the seven markers continued the marking. The students' quantitative scores were used to diagnose the students' academic writing skills level after the intervention process.

ADDIE Model - Phase 3: Stage 5 - Evaluation: The resources used in the study to address the instructional needs of the students were the collaborative intervention approach of a lecturer and the writing centre, as a collaborative scaffolded approach to address the students' academic writing challenges. At this stage of the ADDIE model (Evaluation), an assessment of the effect of the collaborative intervention project on the students' performance was conducted. To evaluate the study quantitatively, assessment scores (pre and post-test) were compared, and Google Survey Forms were used to gather data from the students.

3.5 Data analysis

The paired-sample t-test, also known as the dependent t-test in Statistical Package for Social Scientists (SPSS), was used to analyse quantitative data in order to obtain informative and inferential statistical findings. Descriptive statistics, such as variable types (nominal, ordinal, interval, and ratio), frequency, and percentage, were included in SPSS 25 (Kaur et al., 2018). The paired-sample t-test was computed and compared using SPSS version 27 to obtain the relevant data required for comparison

and drawing conclusions. In order to facilitate the subjective interpretation of data content from the qualitative data, a systematic categorisation process of coding and identification of themes or patterns using qualitative content analysis was conducted (Shava et al., 2021).

3.6. Ethical consideration

Ethical approval, UFS-HSD2022/0231/22, was obtained from the university where the students are registered for their first year in the B.Ed. SEN&FET phase degree prior to data collection. A gatekeeper's consent to use university students was obtained. All participants gave their informed consent, and precautions were taken to ensure the privacy and confidentiality of the students (Creswell, 2020; Clark-Kazak, 2017).

4. Presentation of Results

4.1 Segment 1: Performance before assistance – ADDIE Model stage 1 ‘Analysis’ and the Zone of Proximal Development

In this segment of the results analysis, we will present qualitative and quantitative data analysis. The first stage of the ADDIE model, analysis, helped the intervention project by conducting a diagnosis of ZPD in the students' academic writing abilities required for the assessment. During this stage, the students were given an essay assignment that they had to complete independently, without assistance from the writing centre.

4.1.1 Qualitative analysis

After the marking process was completed, the markers' comments revealed that the students experienced challenges in the assessment, as presented in the themes that emerged below:

Assignment content

According to the findings, students had trouble comprehending the essay prompt's topic. The evaluators concurred that although a few students mentioned the subject in class, the data they presented were shallow and uninformative. The following observations were made by the participants:

They need to improve on conceptualising the content and know more about how to write an academic essay, which is the reason why some students get below 10 marks. (Marker 3).

Responding to the essay question: Some students did not or failed to respond to the essay/assignment question. Their responses did not reflect a level of understanding, and they did not fully answer the question: Some responded to the first half of the question, neglecting the second part or vice versa. (Marker 7).

The organisation of the assignment

The findings showed that pupils had trouble successfully organising their academic work. Participants saw that many students had trouble keeping their writing coherent and well-organised. The participants noted what they established as follows:

The introduction lacked a roadmap, and it mainly was the definition of the words. Some were using bullet points instead of paragraphs. Students need to learn to use subheadings and the number of sentences needed per paragraph. Some had a reasonable conclusion. Others continued and raised new points in the conclusion. (Marker 6).

Secondly, the students performed poorly when it came to structuring the essay. Several essays did not have an introduction or a conclusion. For those that had an introduction and conclusion, critical elements such as the road map, the brief conceptualisation of both professionalism and professional teacher identity were missing, and the thesis statement (the

introduction) and summary of main ideas and rephrasing of the thesis statement (the conclusion). (Marker 4).

Language and mechanics

Keeping the essay assignment coherent was one of the difficulties that the students encountered in the study. The markers concluded that the students' frequent editorial and grammatical errors demonstrated their lack of proofreading. For instance, the markers' quotations that follow provide further details:

Furthermore, the students cannot provide a sound and coherent argumentation in their essays; there is no flow of ideas, the student's voices, and perspectives (are mostly missing), and their ideas are not supported by academic literature. In addition, the essays had several structural, language, and grammatical errors. (Marker 4).

Coherence also seemed to be a problem. (Marker 3).

Reference lists and in-text citations

The markers expressed concern over the students' inadequate understanding of proper referencing techniques, including both in-text citations and reference lists. They had just copied and pasted instead of paraphrasing, resulting in high similarity indexes. The markers also expressed disappointment that the discussions had lost their significance, as it seemed like the students were relying on Google paraphrase tools. The following is what the markers shared:

This student needs to improve on in-text referencing and know how to compile reference lists according to the Harvard style of referencing. Some just copied links to their reference list, which does not follow the academic style of referencing. Some just copied and pasted the essay without paraphrasing it, which contributed to the higher plagiarism percentage recorded in the assignment. (Marker 1).

High plagiarism due to poor paraphrasing skills and such students were advised to visit the writing site for proper tutelage. Most of the learners could not adhere to the prescribed referencing style and more so some of them don't know how to use in-text citations. Some had a high similarity percentage due to complete copying and pasting of another student's assignment. (Marker 2).

4.1.2 Quantitative analysis

The analysis in stage 1 of the ADDIE model, 'Analysis', revealed the results presented in Table 1 and Table 2.

Table 1: *The experimental and control groups' mean and standard deviation before the intervention*

		N	Mean scores	Std. Deviation	Std. Error Mean
Group	Experimental	108	10.44	4.322	.415
	Control	108	11.44	4.315	.415

Table 1 indicates the mean scores, which are the average scores that the students obtained in the control and experimental groups on their essay assignments before the intervention from the writing centre.

Table 2: *The experimental and control groups' independent samples test before the intervention*

	Levene's Test for Equality of Variances	t-test for Equality of Means

		F	Sig.	t	Df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
EXP0001	Equal variances assumed	.168	.683	-1.686	214	.047	.093	-.990	.587	-2.149	.167
	Equal variances not assumed			-1.686	213.999	.047	.093	-.990	.587	-2.149	.167

Table 2 indicates that Levene’s test for equality of variances revealed that the variances were homogenous for competence, $p > .05$ (Table 2). Hence, in conducting the test, equality of variance was assumed. The 108 participants who received writing intervention ($M = 10.44, SD = 4.322$) in comparison to the 108 participant students in the control group ($M = 11.44, SD = 4.315$), did not show a significant difference in scores before the intervention, $t(214) = -1.686, p = .09$ (Table 1 and Table 2). The two groups of students can, therefore, be assumed to be of similar ability.

4.2 Segment 2: Performance after Writing Centre Scaffolding Assistance: ADDIE Model stage 5 ‘Evaluation’

In this segment, the ADDIE model stage, evaluation, and the scaffolded assistance from the writing centre of results were analysed and presented quantitatively. The last stage of the ADDIE model, evaluation, assisted the intervention project in evaluating if there was an effect on the students' academic writing ability levels required in the assessment after visits to the writing centre for a scaffolded intervention. Tables 3 to 9 provide the quantitative analysis.

Table 3: Mean and standard deviation of pre- and post-intervention for the experimental group

	Mean	N	Std. Deviation	Std. Error Mean
Experimental group pre-intervention	10.44	108	4.322	.415
Experimental group post-intervention	13.88	108	2.824	.272

The mean scores as specified in Table 3 are the average assessment score for the experimental group on pre-and post-intervention. More details on the mean scores and the deviations are given in the explanation in Table 4 below.

Table 4: Paired samples test for the experimental group pre- and post-intervention

	Paired Differences				T	Df	Significance	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			One-Sided p	Two-Sided p
	-3.435	3.814	.367	-4.163 -2.708	-9.360	107	<.001	<.001

Table 4 indicates that there was a significant improvement in the student’s performance scores in the final draft submitted after the intervention by the writing centre ($M = 13.88, SD = 2.824$) as compared to the student’s performance scores before the writing centre intervention ($M = 10.44, SD = 2.824$), $t(107) = -9.360, p < .001$ (Tables 3 and 4).

Table 5: Mean and standard deviation of the control group pre- and post-intervention

	Mean	N	Std. Deviation	Std. Error Mean
Control group initially	11.44	108	4.315	.415
Control group after a semester	11.22	108	3.826	.368

The mean scores specified in Table 5 are the average assessment scores for the control group on pre and post-intervention. More details on the mean scores and the deviations shown are given in the explanation in Table 6 below.

Table 6: Paired samples test for the control group pre- and post-intervention

Paired Differences				t	df	Significance		
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			One-Sided p	Two-Sided p	
			Lower	Upper				
.21296	4.44499	.42772	.63494	1.06087	.498	107	.310	.620

There was no significant effect of improvement for the 108 participants who did not receive the writing intervention after the initial stage of submission ($M = 11.44$, $SD = 4.315$) and a month later ($M = 11.22$, $SD = 3.826$), $t(107) = 0.498$, $p = .62$ (Table 5 and 6).

Table 7: Mean and standard deviation of the experimental and control group after intervention

VAR00007	N	Mean	Std. Deviation	Std. Error Mean
Experimental group	108	13.88	2.824	.271
Control group	108	11.22	3.826	.368

The average evaluation scores for the control group before and after the intervention are listed in Table 5. The explanation of Table 8 below provides further information on the mean scores and the variances that are displayed.

Table 8: Independent samples test - comparing the experimental and control groups after intervention

		Levene's Test for Equality of Variances		T-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Equal variances assumed	9.163	.003	5.807	214	<.001	<.001	2.657	.458	1.755	3.559	
Equal variances not assumed			5.807	196.898	<.001	<.001	2.657	.458	1.754	3.559	

Levene's test for equality of variances showed heterogeneity of variances for competence, $p < .05$ (Table 8). The 108 student participants in the experimental group ($M = 13.88$, $SD = 2.824$) compared to the 108 student participants in the control group ($M = 11.22$, $SD = 3.826$) exhibited scores that were significantly higher than their counterparts after the intervention, $t(214) = 5.807$, $p < .001$ (Table 7 and Table 8). Therefore, the data in Table 8 revealed that the intervention significantly affected the scores of students who went for consultations at the writing centre.

Table 9: The Academic Writing Centre offers students a supportive and cooperative scaffolded learning environment

Statements	Responses				Total	
	No	%	Yes	%	N	%
Comprehend the theme, objective, or focus of my essay task.	10	20	40	80	50	100
Generate concepts on the topic matter.	19	38	31	62	50	100
Construct a central argument and provide corroborating evidence for the assertions made in my essay task.	20	40	30	60	50	100
Adhere to the appropriate structure for my essay tasks.	13	26	37	74	50	100
Organise and connect my ideas coherently and logically.	24	48	26	52	50	100
Write well-structured paragraphs.	18	36	32	64	50	100
Find and rectify any language errors in my sentences	22	44	28	56	50	100
Reference my sources effectively and accurately	11	22	39	78	50	100

Table 9 findings suggest that the Academic Writing Centre serves as a beneficial and collaborative scaffolded method for students to enhance their academic writing skills. Among the respondents, 80% comprehended the topic, purpose, and subject of their essay assignments, while 62% acknowledged its effectiveness in facilitating idea generation for assignment topics. Additionally, 60% reported success in formulating thesis statements and supporting arguments, with 74% affirming their adherence to proper essay structure. However, only 52% felt it aided in organising and logically linking ideas within their essays. Still, 64% found assistance in crafting well-formulated paragraphs, and 56% identified writing errors during their essay composition. Furthermore, 78% acknowledged its role in effectively and accurately referencing sources within their assignments.

Table 10: Student's views on the collaborative intervention

Statements	Details of the consultations										Total	
	SD		D		N		A		SA		N	%
	N	%	N	%	N	%	N	%	N	%		
I believe the consultation helped my paper.	0	0	0	0	9	18	25	50	16	32	50	100
I intend to visit for another consultation at the Write Site.	0	0	1	2	2	4	21	42	26	52	50	100
Do you believe that your module lecturer's engagement in the initiative inspired you to contact the Write Site?	0	0	1	2	3	6	20	40	26	52	50	100

Table 10 results revealed that half of the participants, specifically twenty-five individuals, indicated that their essays improved as a result of Academic Writing Centre consultations. Additionally, twenty-six respondents, or 52%, expressed a strong intention to return to the Academic Writing Centre for further consultations. Likewise, the survey revealed that an equal number of participants,

twenty-six individuals or 52%, believed that the lecturer's involvement could potentially motivate them to use the Academic Writing Centre's services.

5. Discussion of Findings

The integration of the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model as a framework for the collaborative intervention process yielded results of a potential path in the Scholarship of Teaching and Learning (SoTL). This potential path forward when Learning and Teaching (L&T) theories are blended with sound research techniques. As instructors are continuously faced with paradigm changes, such as more coordinating and facilitative roles, innovative shifts towards effective ways of assisting them with such shifts are pivotal for dynamic and captivating learning environments to assist students in reaching their goals (Mhlongo et al., 2023).

The results of this study indicated how every stage of the ADDIE model was essential to assuring a methodological approach to the design and accomplishment of the intervention. The ADDIE model steps enabled the structured collaborative intervention assessment to facilitate a comprehensive understanding and improvement of the L&T practices (Dousay & Stefaniak, 2023). As various scholars attest, the findings highlighted the value of evidence-based practices and scholarly inquiry into teaching and learning processes, as the ADDIE model's systematic approach ensured findings that are grounded in theory and practice, fostering significant contributions to the research of teaching and learning (Basu, 2018; Hess & Greer, 2016; Sahaat et al., 2020).

Central to the success of the intervention was the scaffolded approach emphasised by the facilitation of the ADDIE model. By progressively building upon foundational concepts and skills, the intervention effectively supported the students in mastering various complex aspects of the assessment's objectives (Berk & Winsler, 1995; Vygotsky, 1978). The design and development phases allowed for the creation of tailored instructional materials and activities, ensuring that learners received appropriate support at each stage of the assessment process (Taber, 2020). As such, challenges usually experienced by scholars who are not specialists in instructional design, as Webb et al. (2024) indicate, could be mitigated.

Adopting a systematic approach guided by the ADDIE model, the instructors who were also researchers were able to make meaningful contributions to the scholarship of teaching and learning while enhancing educational practices and outcomes. From the analysis of pre-existing educational challenges to the evaluation of the intervention outcomes, the research methodologies employed together with the ADDIE model aligned the collaborative scaffolded intervention with established principles of educational research (Sahaat et al., 2020; Foster, 2024).

6. Conclusions and Recommendations

The objective of this study was to explore the value of integrating organised frameworks such as the ADDIE model with a learning and teaching theory, the Zone of Proximal Development (ZPD), and a scaffolded approach, using mixed methods as a sound methodology. The aim was to improve the planning, implementation, and evaluation of an educational intervention for enhanced teaching and learning. The findings of this study demonstrate the efficacy of integrating the ADDIE model with L&T theories and sound research methodologies in Scholarship of Teaching and Learning projects. The study concludes that each phase of the ADDIE model provides a framework for grounding the intervention in established educational principles and theories, ensuring that the intervention is theoretically sound and pedagogically effective.

The study sought to contribute to the scholarship of teaching and learning by providing insights into the systematic application of various methodologies in educational research and practices. The study, therefore, recommends that to inform future research efforts on teaching and learning in various

educational contexts, using teaching and learning models in any interventions aimed at improving pedagogies and learning should be emphasised, based on the importance of thoughtful planning, implementation, and evaluation processes.

7. Declarations

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