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Research Article

Curriculum Implementation with a Plan: An Exploratory Analysis of Pre-service Teachers' Application of Gagne's Nine Events of Instruction

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This study explored Ghanaian pre-service teachers' application of Gagne's instructional design. A sample of 135 pre-service teachers on internships at different pre-tertiary institutions participated by responding to Gagne's nine events of instruction. The data were analysed descriptively (means/SD) and inferentially (MANOVA). The study revealed that pre-service teachers seem to be more aligned with traditional and less student-centred approaches. The findings suggest a lack of emphasis on strategies that promote active engagement, clear communication of objectives, building on prior knowledge, diverse content presentation, guidance and support, eliciting performance through practice, effective feedback, and enhancing retention and transfer. However, there were no substantial gender- or level-based differences in the application of the instructional model. Therefore, training programmes for teachers should be student-centred and highlight the benefits of connecting new information to familiar concepts for better comprehension.

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Introduction

Instructional design in any teaching and learning environment is critical to the success or otherwise of the learning outcomes of students. According to Khadjooi et al. (2011), both the instructors' and the students' behaviours during class time are considered instructional events. A well-designed lesson relies on careful event selection, format development, and sequential execution. A lesson plan is a blueprint outlining the sequence, duration, and content of individual teaching activities. There are two main considerations when making a lesson plan: the goals and the students. Several instructional designs have been propounded to guide processes in both traditional and contemporary teaching and learning environments. Several designs have been highlighted in extant literature; however, Robert Gagne's design has popularly been used (Ariffin et al., 2022; Gagné et al., 1992; Gagné, 1965; Gagne & Briggs, 1974). Undoubtedly, many amazing ideas for training and teaching have come from Robert Gagne's theoretical framework for systematic approaches to instructional design, focusing on learning outcomes and how to arrange specific instructional events to accomplish those results. Gagne's approach to instructional design is grounded in the information processing model of the mental events

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that occur when humans are exposed to different stimuli (Anyatasia et al., 2020; Higgins, 2023; Khadjooi et al., 2011; Saraswathi & Stanly, 2019).

Considerable research has revealed improvement in teaching and learning when Gagné's nine events of learning and instruction were applied (Berger-Estilita et al., 2020; Owaidah, 2022; Vijayakumar et al., 2023). For example, using Gagné's nine events of learning and instruction, Owaidah (2022) found that most trainees indicated that the training session was very useful in terms of imparting knowledge about communication. Again, Berger-Estilita et al. (2020) used Gagné's "Instructional Design" to teach clinically relevant knowledge in small groups. The study found that 82% of the residents who took the post-lecture knowledge assessment had the correct answers to the treatment options and that the residents' overall views on the lecture concept were 4.8, 0.3 for the lecture concept and realisation and 4.7, 0.5 regarding motivation, participation, and climate. In addition, Vijayakumar et al. (2023) investigated the impact of Gagne's model on L2 online environments. They found that the final grades of the students increased after Gagne's intervention. The students' feedback also supported the proposed instructional model. Likewise, Gagne's instructional design and more traditional approaches to teaching science were compared to see which was more helpful in developing students' critical thinking abilities at the secondary level. D'souza and Kasinath (2010) found Gagne's design to be effective in improving classroom education across disciplines and leading to enhanced critical thinking abilities in students.

Literature Review

Most educational systems around the world promote contemporary pedagogical practices that support effective teaching and learning. Extant literature demonstrates that gender plays a pivotal role in teachers' pedagogical practices. Consequently, gender has emerged as a significant determinant in the selection of instructional designs and pedagogical approaches employed by educators. The results of several empirical studies exhibit a lack of consensus and display considerable variation. However, prior findings from many countries have suggested that the gender of teachers influences their instructional designs and the selection of teaching and learning resources. For instance, Alnahdi and Schwab (2023) conducted a study examining the impact of gender on teachers' teaching practices. Their findings revealed that female teachers exhibited more favourable attitudes towards teaching and received higher ratings in terms of instructional practices. According to Chudgar and Sankar's (2008) research conducted among teachers in India, it was observed that female teachers exhibit a greater inclination towards fostering an inclusive learning environment for all learners as opposed to their male counterparts. Haroun et al. (2016) looked into the differences in instructors' levels of mathematical expertise in Saudi Arabia based on gender. The findings of the study revealed that female educators possess a greater degree of understanding of mathematical topics in comparison to their male counterparts.

Inasmuch as Gagne's nine events of instructional design are important to the success of learning outcomes, their applicability depends on teachers' knowledge and practices in the learning environment. Effective teachers are able to align their teaching curriculum and syllabi with Gagne's instructional design (Mupa & Chinooneka, 2015). Therefore, it is expected that every teacher—pre-service and in-service—embed in their curriculum and syllabi aspects of Gagne's instructional design for the successful achievement of learning outcomes (Anam, 2022; Chinda, 2022).

Ghanaian Context

In Ghana, for instance, the new Standard-Based Curriculum is being implemented. This is after the Ghana Education Service and Ministry of Education had trained all K–12 teachers (basic) on the use of the new curriculum. The curriculum targets six key competence areas such as critical thinking and problem-solving, creativity and innovation, communication and collaboration, cultural identity and global citizenship, personal development and leadership, as well as digital literacy (Apau, 2022; Mahama, 2022; Sampson, 2022). The New Standard-Based Curriculum has been made a mandatory rudiment in the training of teachers for the pre-tertiary education system in Ghana. By implication, pre-service teachers are expected to implement the curriculum in their mandatory practicum with appropriate instructional design that reflects Gagne's nine events of instructional design.

Instructional designs (methods of teaching) are taught to pre-service teachers, and they are examined as well (Comba et al., 2018; Torto, 2017), where most of the strategies and approaches are in line with Gagne's nine events of instruction. Therefore, it is assumed that pre-service teachers are applying an appropriate instructional design that relates to Gagne's suggestion.

Nonetheless, it is yet to be ascertained whether pre-service teachers adequately use instructional designs in their pre-teaching classrooms across the Ghanaian educational landscape. Therefore, the current study sought to examine the extent to which instructional designs are applied and how gender influences the extent to which they are applied, with Gagne's nine events of instruction as a focal point.

Methodology

Design and Instruments

The study utilized a descriptive quantitative approach to investigate pre-service teachers' application of the instructional design proposed by Gagne. The study adopted the 36 statements under the instructional design (Gagne, 1967, 1974). To make them suitable for use in the Ghanaian context, some wordings of the scales were modified to align with Ghanaian traditional and diverse categorizations. The internal consistency of the inventory, assessed using the Cronbach reliability coefficient, was found to be .880.

Participants and Sampling

The study conveniently sampled 135 pre-service teachers under internship in the Effutu Municipality and Gomoa West District in the Central Region of Ghana. The pre-service teachers were presented with informed consent documents to indicate their availability and willingness to participate in the study. Out of the 135 pre-service teachers, 51.1% were males while 48.9% were females. Furthermore, the pre-service teachers had taught for a period ranging from six months to two years. Predominantly, the pre-service teachers were Akan and Effutu speakers, despite the cosmopolitan nature of the study area, where Ewe and Hausa speakers are also present (Ghana Statistical Service, 2021).

Data Analysis

The adapted instruments utilized a four-point Likert-type scale with response options of 'Strongly Agree' (SA), 'Agree' (A), 'Disagree' (D), and 'Strongly Disagree' (SD). The maximum score achievable on any item for each scale was 4.0, indicating unanimous agreement among all participants. Conversely, the minimum score possible on each scale was 1.0, representing unanimous disagreement with the item. Therefore, the cutoff point was determined as either 4.0 - 1.50 or 1.0 + 1.50, resulting in a value of 2.50 in both cases. This cutoff point was utilized to determine respondents' agreement or disagreement with the scale items. Data analysis involved the use of means, standard deviations, and multivariate analysis of variance (MANOVA).

Results

The demographic data of the pre-service teachers participating in the study are presented in the table. The sample consists of a total of 135 pre-service teachers, with varying levels of practice and gender representation.

Levels Pre-service Teachers' Practice	Frequency	Percent
Early Grade	23	17.0
Upper Primary	52	38.5
Junior High	60	44.4
Total	**135**	**100.0**
Gender		
Male	69	51.1
Female	66	48.9
Total	**135**	**100.0**

Table 1. Demographic Data of Pre-service Teachers

From Table 1, the pre-service teachers' practice levels are categorized into three groups: Early Grade, Upper Primary, and Junior High. Among these, the largest group is the Junior High level with 60 participants (44.4%), followed by the Upper Primary level with 52 participants (38.5%), and the Early Grade level with 23 participants (17.0%). In terms of gender distribution, there were 69 male participants (51.1%) and 66 female participants (48.9%), making it a fairly balanced representation of genders within the sample.

In a nutshell, the sample consists of pre-service teachers with varying levels of practice, predominantly at the Junior High level. The gender distribution within the sample is relatively balanced between male and female participants. This demographic information provides an overview of the composition of the participants and sets the context for further analysis and interpretation of the study's findings.

Pre-service Teachers' Application of Gagne Instructional Plan

The study aimed to assess the teaching practices employed by the instructor across various aspects of effective pedagogy in Gagne's nine events of instruction. Teachers responded to a five-point Likert-type scale ranging from strongly disagree to strongly agree (1-4). In this, a criterion threshold of 2.50 was established (1+2+3+4=10/4=2.50). Based on this 2.50 threshold, mean scores above are accepted as agreed, and mean scores below are accepted as disagreed. Table 2 presents the results.

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Statements	Mean	SD	Decision
Gain attention of the students			
1. I do start my lesson through using a surprising event	2.73	1.13	Agreed
2. I do start my lessons by posing thought-provoking questions to students.	2.98	1.37	Agreed
3. I do start my lessons by giving students the opportunity to ask themselves questions as well as answering them.	2.72	1.21	Agreed
4. I start my lessons by drawing from previous knowledge and current feelings of students.	1.51	.85	Disagreed
Inform students of the objectives			
1. I make clear to students the required performance in a lesson.	1.99	1.09	Disagreed
2. I make clear to students the criteria for standard performance in a lesson.	2.38	1.11	Disagreed
3. I allow students to set criteria for standard performance in a lesson.	3.00	1.32	Agreed
4. I take into consideration course objectives on assessment prompts in a lesson.	1.96	1.52	Disagreed
Stimulate recall of prior learning			
1. I teach by building on students' previous experiences in a lesson.	1.39	.67	Disagreed
2. I teach by probing students on their understanding of previous concepts in a lesson.	1.56	.79	Disagreed
3. I teach by relating previous course information to the current topic in a lesson.	1.64	.81	Disagreed
4. I teach by allowing students to incorporate prior learning into current activities in a lesson.	1.85	.89	Disagreed
Presenting the content			
1. I teach by presenting the same content using several mediums (video, demonstration, group work) in a lesson.	2.33	1.04	Disagreed
2. I teach by using a variety of media to engage students in learning concepts.	2.47	.99	Disagreed
3. I teach by incorporating active learning strategies to keep students involved in a lesson.	2.00	.91	Disagreed
4. I teach by providing access to content on the blackboard so students can access it outside of class in a lesson.	2.12	1.00	Disagreed
Provide learning guidance			
1. I teach by providing instructional support as needed (e.g., scaffolding).	2.19	.95	Disagreed
2. I teach by modelling varied learning strategies (e.g., mnemonics, concept mapping, role-playing, visualizing).	2.13	.88	Disagreed
3. I teach by using examples and non-examples to help students see what to do and see what not to do.	1.97	.93	Disagreed
4. I teach by providing case studies, visual images, analogies, and metaphors to help students connect with new concepts.	2.47	1.08	Disagreed
Eliciting performance (practice)			
1. I teach by facilitating student activities through deep-learning questions, collaborating with their peers, and facilitating practical exercises.	2.41	1.03	Disagreed
2. I teach by providing formative assessment opportunities through written assignments, individual or group projects, presentations.	1.62	.83	Disagreed
3. I design effective quizzes and tests in ways that allow students to demonstrate their comprehension and application of course concepts.	1.91	.95	Disagreed

Statements	Mean	SD	Decision
Provide feedback			
1. I inform students that they did what they were supposed to do after a lesson.	2.48	1.13	Disagreed
2. I apprise students of the accuracy of their performance or response but do not provide guidance on how to progress after a lesson.	3.31	1.44	Agreed
3. I direct students to find the correct answer but do not provide the correct answer after a lesson.	3.22	1.29	Agreed
4. I provide students with suggestions, directives, and information to help them improve their performance after a lesson.	2.04	1.09	Disagreed
5. I help students to identify learning gaps and performance shortcomings in their own and peers' work after a lesson.	3.41	1.36	Agreed
Assess performance			
1. I administer pre- and post-tests to check for progression of competency in content or skills in a lesson.	2.50	1.11	Agreed
2. I insert formative assessment opportunities throughout instruction using oral questioning, short active learning activities, or quizzes.	2.20	.94	Disagreed
3. I implement a variety of assessment methods to provide students with multiple opportunities to demonstrate proficiency.	1.78	.83	Disagreed
4. I create objective, effective rubrics to assess written assignments, projects, or presentations of students.	2.03	.88	Disagreed
Enhance retention and transfer			
1. I avoid isolating course content; rather, I associate course concepts with prior (and future) concepts and build upon prior (and preview future) learning to reinforce connections.	2.39	1.10	Disagreed
2. I continually incorporate questions from previous tests in subsequent examinations to reinforce course information for students.	2.37	1.02	Disagreed
3. I make students convert information learned in one format into another format (e.g., verbal or visuospatial).	2.30	.90	Disagreed
4. I promote deep learning, clearly articulate lesson goals, and use specific goals to guide instructional design, and align learning activities to lesson goals for students.	2.53	.94	Agreed

Table 2. Pre-service Teachers' Application of Gagne Instructional Plan

From Table 2, the responses from the pre-service teachers were evaluated in terms of mean scores and standard deviations. The Likert scale was used to gauge the pre-service teachers' agreement or disagreement with specific teaching strategies. Specific to the attention and engagement of students, the pre-service teachers agreed with the practice of starting lessons with attention-grabbing elements, such as surprising events and thought-provoking questions. Additionally, the instructor acknowledged the importance of allowing students to ask and answer questions, thus indicating a commitment to engaging students right from the beginning of the lessons.

In terms of the clear communication of objectives, the results revealed a disagreement in the pre-service teachers' approach to informing students about lesson objectives and performance criteria. The pre-service teachers disagreed with clearly communicating required performance, criteria for standard performance, and the incorporation of course objectives into assessment prompts.Regarding building on prior knowledge, the pre-service teachers disagreed with the practice of teaching by building on students' previous experiences and connecting previous course information to the current topic. This suggests a divergence from strategies aimed at stimulating the recall of prior learning as part of the teaching

process.With respect to diverse content presentation, the pre-service teachers showed disagreement with using diverse media and active learning strategies to present content. Furthermore, the pre-service teachers did not prioritise making content accessible outside of class. This suggests a preference for more traditional modes of content presentation.

Based on the guidance and support of students, the pre-service teachers indicated a lack of emphasis on providing instructional support, modeling learning strategies, and offering examples and non-examples. This suggests a departure from practices that offer guidance and support to enhance student learning.In terms of eliciting performance and the practice of students, the pre-service teachers disagreed with facilitating student activities and providing formative assessment opportunities. Moreover, the pre-service teachers did not appear to design effective assessment tools and tests that allow students to showcase their comprehension and application of course concepts.

With respect to feedback and assessment, the pre-service teachers disagreed with various aspects of providing feedback, including guiding students on improvement, providing correct answers, and helping students identify learning gaps. However, the instructor did agree with apprising students of the accuracy of their performance or response.

Regarding enhancing retention and transfer, the pre-service teachers disagreed with strategies aimed at enhancing retention and transfer, such as associating concepts with prior and future learning, incorporating questions from previous tests, and promoting the conversion of information into different formats.

Conclusively, the pre-service teachers' teaching practices seem to be more aligned with traditional and less student-centered approaches. The findings suggest a lack of emphasis on strategies that promote active engagement, clear communication of objectives, building on prior knowledge, diverse content presentation, guidance and support, eliciting performance through practice, effective feedback, and enhancing retention and transfer. This evaluation provides insights into areas where instructional strategies could be adjusted to better align with student-centered and evidence-based pedagogical approaches.

Gender Difference in Pre-service Teachers' Use of Gagne Instructional Plan

The current study aimed to investigate the potential differences in the application of Gagne's nine events of teaching or instruction among pre-service teachers based on their gender. The nine events included gain attention, inform students of the objectives, stimulate recall of prior learning, present the content, provide learning guidance, elicit performance (practice), provide feedback, assess performance, and enhance retention and transfer. Table 3 presents the results.

Box's Test of Equality of Covariance Matrices							
Box's M		126.226					
F		2.604					
df1		45					
df2		57871.867					
Sig.		.000					
Multivariate Tests							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.965	383.456	9.000	125.000	.000	.965
	Wilks' Lambda	.035	383.456	9.000	125.000	.000	.965
	Hotelling's Trace	27.609	383.456	9.000	125.000	.000	.965
	Roy's Largest Root	27.609	383.456	9.000	125.000	.000	.965
Gender	Pillai's Trace	.028	.398	9.000	125.000	.934	.028
	Wilks' Lambda	.972	.398	9.000	125.000	.934	.028
	Hotelling's Trace	.029	.398	9.000	125.000	.934	.028
	Roy's Largest Root	.029	.398	9.000	125.000	.934	.028

Table 3. Multivariate Tests for the significance difference between pre-service teachers' use of the Gagne Instructional Plan and Gender

From Table 3, The Box's Test of Equality of Covariance Matrices indicated a statistically significant difference between the covariance matrices of the dependent variables based on gender (Box's M = 126.226, F = 2.604, df1 = 45, df2 = 57871.867, p <.001). With this, an overall multivariate analysis was conducted to assess the effect of gender on the pre-service teachers' application of Gagne's nine events of teaching or instruction. The Pillai's Trace statistic was employed as the effect size measure, and the results indicated a significant multivariate effect of gender on the combined dependent variables (V =.965, F = 383.456, df1 = 9, df2 = 125, p <.001, partial η^2 =.965). This suggests that the gender of pre-service teachers has a substantial influence. However, further examination of the individual events within the Gagne Lesson Plan revealed that gender had a minimal effect on pre-service teachers' application of the events (Pillai's Trace =.028, F =.398, df1 = 9, df2 = 125, p =.934, partial η^2 =.028). This implies that there is no significant difference between male and female pre-service teachers in terms of applying these instructional events.

The findings of this study demonstrate a significant multivariate effect of gender on the overall application of Gagne's nine events of teaching or instruction among pre-service teachers. However, when considering each event individually, there is no substantial gender-based difference. This suggests that both male and female pre-service teachers exhibit similar levels of competence in applying these instructional strategies.

Difference in Pre-service Teachers' Use of the Gagne Instructional Plan based on the Level they Teach

The present study sought to examine potential variations in the application of Gagne's nine events of teaching or instruction among pre-service teachers, with a focus on the levels they teach—early grade, upper primary, and junior high. The nine events encompass gaining attention, informing students of the objectives, stimulating recall of prior learning,

presenting the content, providing learning guidance, eliciting performance (practice), providing feedback, assessing performance, and enhancing retention and transfer. Table 4 presents the results.

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Box's Test of Equality of Covariance Matrices							
Box's M		182.502					
F		1.779					
df1		90					
df2		15187.942					
Sig.		.000					
Multivariate Tests							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.959	323.798	9.000	124.000	.000	.959
	Wilks' Lambda	.041	323.798	9.000	124.000	.000	.959
	Hotelling's Trace	23.501	323.798	9.000	124.000	.000	.959
	Roy's Largest Root	23.501	323.798	9.000	124.000	.000	.959
Level	Pillai's Trace	.144	1.074	18.000	250.000	.379	.072
	Wilks' Lambda	.861	1.068	18.000	248.000	.386	.072
	Hotelling's Trace	.155	1.061	18.000	246.000	.392	.072
	Roy's Largest Root	.097	1.354	9.000	125.000	.216	.089

Table 4. Multivariate Tests for the significance difference between pre-service teachers' use of the Gagne Lesson Plan and the Levels they Teach (Early Grade, Upper Primary, and Junior High)

From Table 4, the Box's Test of Equality of Covariance Matrices revealed a statistically significant difference in the covariance matrices of the dependent variables based on the levels pre-service teachers teach (Box's M = 182.502, F = 1.779, df1 = 90, df2 = 15187.942, p <.001). With this, an overall multivariate analysis was conducted to examine the effect of the levels pre-service teachers teach on their application of Gagne's nine events of teaching or instruction. The Pillai's Trace statistic was employed as the effect size measure, indicating a significant multivariate effect of the levels taught on the combined dependent variables (V =.959, *F* = 323.798, df1 = 9, df2 = 124, p <.001, partial η^2 =.959). This suggests that the levels pre-service teachers teach have a considerable impact on their utilization of the Gagne Lesson Plan components.

However, further exploration of individual events indicated a modest effect of the levels taught on pre-service teachers' application of the events (Pillai's Trace =.144, *F* = 1.074, df1 = 18, df2 = 250, p =.379, partial η^2 =.072). This implies that there might be some variability in how pre-service teachers from different levels apply these instructional events, although this effect is not statistically significant.

Discussion

The findings from the provided literature reveal a complex landscape of pre-service teachers' attitudes towards various instructional practices, underscoring potential gaps between traditional and student-centered pedagogies. One significant area in which pre-service teachers seem to show alignment with effective practices is attention and engagement. The consensus among pre-service teachers on the importance of initiating lessons with attention-grabbing elements, such as surprising events and thought-provoking questions, reflects a recognition of the critical role of engagement in effective teaching. This approach is substantiated by research that emphasizes the significance of capturing learners' interest from the beginning of lessons (Owaidah, 2022; Vijayakumar et al., 2023). Moreover, the acknowledgment of the

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instructor's commitment to encouraging student questions further reinforces the importance of student engagement by promoting an interactive and participatory learning environment (Berger-Estilita & Greif, 2020).

Conversely, the findings indicate a potential misalignment with student-centered strategies in the domain of clear communication of objectives. The disagreement among pre-service teachers regarding communicating lesson objectives and performance criteria suggests a gap in understanding the pedagogical value of transparently outlining learning goals. This finding contrasts with contemporary educational research that emphasizes the positive impact of clear learning objectives on student motivation and achievement (D'souza & Kasinath, 2010; Saraswathi & Stanly, 2019). Incorporating course objectives into assessment prompts, which received disagreement from pre-service teachers, has been recognized as an effective strategy to guide students' efforts towards meeting learning outcomes (Saraswathi & Stanly, 2019).

Similarly, the divergence of pre-service teachers from practices involving building on prior knowledge highlights a potential limitation in tapping into students' existing experiences as a foundation for new learning. Research supports the benefits of activating prior knowledge for comprehension and retention (Ariffin et al., 2022), suggesting a missed opportunity in leveraging students' cognitive frameworks. The findings related to diverse content presentation and guidance and support echo a preference for more traditional, teacher-centered modes of instruction. This preference may hinder the use of innovative pedagogies that encourage active learning and critical thinking (Anyatasia et al., 2020). It is worth noting that effective guidance and support are essential components of student-centered instruction (Higgins, 2023), implying a need to bridge this gap in pre-service teacher training.

The disagreements identified concerning formative assessment, feedback, and retention and transfer strategies underscore a potential limitation in pre-service teachers' grasp of these pedagogical tools' impact on learning outcomes. Research supports the positive influence of formative assessment on learning progress and the significance of constructive feedback in guiding improvement (Higgins, 2023). Furthermore, enhancing retention and transfer through strategies like associating concepts with prior knowledge and promoting varied formats of learning material aligns with cognitive theories of learning (Vijayakumar et al., 2023).

The significant multivariate effect of gender on the overall application of instructional strategies is consistent with the findings of Alnahdi and Schwab (2023). They conducted research that demonstrated female teachers' more favourable attitudes towards teaching and higher ratings in terms of instructional practices, indicating gender's influence on teaching behaviours. Again, the minimal gender-based effect on the application of individual events aligns with previous research by Haroun et al. (2016), who discovered that female educators exhibited a greater degree of expertise in specific domains such as mathematics. This suggests that gender-based differences may not be significant in certain areas of expertise.

Implications for Policy and Practice

Pre-service teachers' agreement with starting lessons using attention-grabbing elements aligns with effective teaching practices that stimulate student interest. This supports the need for teacher training programmes to emphasise the importance of engaging students from the outset of lessons. However, the disagreement among pre-service teachers regarding clear communication of objectives suggests the need for training programmes to stress the significance of transparently outlining learning goals and criteria for success. Incorporating objectives into assessment prompts can help guide students' learning efforts.

It is important to note that the divergence from the practice of building on prior knowledge indicates a potential gap in understanding the importance of activating students' existing knowledge. Therefore, training programmes should highlight the benefits of connecting new information to familiar concepts for better comprehension. Again, the preference for traditional modes of content presentation over diverse media and active learning strategies underscores the necessity for teacher training to expose educators to a variety of instructional methods that cater to different learning styles.

Furthermore, the lack of emphasis on instructional support and modelling learning strategies suggests a need for teacher training programmes to emphasise the role of teachers in guiding and scaffolding student learning, especially on complex topics. Likewise, the disagreement over facilitating student activities and formative assessment opportunities implies that training programmes should emphasise the importance of providing opportunities for students to actively apply their knowledge and receive feedback for improvement.

The discord concerning aspects of feedback and assessment highlights the need for comprehensive training on delivering effective feedback that guides student improvement and identifies learning gaps. The lack of support for strategies enhancing retention and transfer indicates a potential gap in understanding the value of connecting learning across contexts. Teacher training programmes should underscore the importance of long-term knowledge retention and application. The literature references studies on applying appropriate instructional design models and their positive impact on teaching and learning. This suggests that teacher training programmes could incorporate such evidence-based models to enhance the quality of instruction.

Recognising the substantial influence of gender on teaching strategies, teacher training programmes and professional development initiatives should consider integrating gender-sensitive pedagogical approaches. This could involve providing tailored training that addresses the unique strengths and challenges associated with both male and female pre-service teachers. Moreover, school administrations should foster an inclusive and supportive environment that encourages diversity in teaching approaches, acknowledging that gender-related differences can enrich the educational experience.

The notable effect of the levels taught on the combined application of Gagne's nine events of teaching or instruction implies a substantial connection between the levels being taught and the utilisation of instructional strategies. Policymakers and educators should acknowledge the significance of tailoring pedagogical training and support to suit specific educational levels. Teacher preparation programmes could benefit from incorporating context-specific training modules, focusing on how to effectively apply Gagne's instructional model to different age groups and educational settings.

Conclusions

The analysis of pre-service teachers' attitudes and beliefs towards instructional practices highlights a preference for more traditional and less student-centred approaches. The findings point towards potential areas of improvement in teacher education programmes where strategies can be adjusted to align more closely with evidence-based and student-centred pedagogies. By addressing these gaps, teacher training programmes can better equip educators with the knowledge and skills necessary to create engaging, effective, and inclusive learning environments.

While there is an evident gender-based impact on the overall application of instructional strategies, this influence appears to fade when considering individual events. This implies that both male and female pre-service teachers exhibit similar levels of competence in applying Gagne's instructional strategies, irrespective of gender. This finding encourages an equal appreciation of teaching abilities among all pre-service teachers, emphasising their common strengths and capabilities in implementing effective instructional practices.

Again, this study's findings underscore the impact of the levels at which pre-service teachers teach on their application of Gagne's instructional model. Although the individual effects on specific events are not statistically significant, the study suggests the possibility of nuanced differences in how pre-service teachers from different levels utilise these instructional events. While these differences might not warrant major overhauls of teaching strategies, educators should be encouraged to consider the unique demands and characteristics of various educational levels when implementing Gagne's instructional approach.

Statements and Declarations

Data Availability

The data that produced this study is available for sharing upon reasonable request from the author.

Ethical Statement

The study followed all the appropriate ethical principles (e.g., informed consent, anonymity, confidentiality) despite the fact that the respondents were adults and could make decisions for themselves.

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