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(IJEPC)<https://gaexcellence.com/ijepe>ANALYSIS OF THE APPLICATION OF GAGNES'S
THEORY IN PRIMARY SCHOOL MATHEMATICS LESSON
PLANS: A DOCUMENT ANALYSIS STUDYHairunissa Jopri^{1*}¹Department of STEM, Institut Pendidikan Guru Kampus Temenggong Ibrahim, Malaysiahairunissa.jopri@ipgm.edu.my<https://orcid.org/0009-0000-1244-749X>

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Abstract:

This study examines how Gagné's Nine Events of Instruction are represented in primary school Mathematics lesson plans developed by pre-service teachers. Gagné's instructional framework was used as the analytical basis to evaluate the presence and clarity of the nine instructional events within written lesson plans. A qualitative document analysis design was employed, involving five Mathematics lesson plans selected through purposive sampling. The documents were analysed using qualitative content analysis, with each instructional event coded according to whether it was consistently represented, partially represented, or insufficiently represented. The findings indicate that gaining learners' attention, informing learners of the objectives, presenting content, and assessing performance were more consistently represented across the lesson plans. In contrast, stimulating recall of prior learning, providing structured learning guidance, eliciting meaningful performance, providing formative feedback, and enhancing retention and transfer were less consistently represented. Variations were also observed in the depth and clarity with which the instructional events were incorporated into the lesson plans. Overall, the findings suggest that Gagné's instructional framework was represented partially and unevenly rather than uniformly across the analysed documents. The study highlights the need for more structured guidance and practical training to support pre-service teachers in translating instructional theory into systematic Mathematics lesson planning, particularly in areas involving scaffolding, formative feedback, and transfer of learning.

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Document Analysis, Gagné's Nine Events of Instruction, Lesson Planning, Mathematics Education, Pre-Service Teachers



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Introduction

Lesson planning is a fundamental component of effective teaching because it enables teachers to organise learning experiences systematically, align instructional activities with curriculum objectives, and select appropriate assessment strategies and learning resources. A well-designed lesson plan provides a clear structure for classroom instruction and supports meaningful learning by ensuring that teaching activities are sequenced purposefully (Iqbal et al., 2021). In Mathematics education, effective lesson planning is particularly important because mathematical learning often requires logical sequencing, explicit connections between prior and new knowledge, active learner engagement, guided practice, feedback, and opportunities to apply concepts in different contexts.

One instructional framework that provides a systematic structure for lesson planning is Gagné's Theory of Instruction. Gagné (1985) proposed nine events of instruction designed to support the cognitive processes involved in learning. These events comprise gaining learners' attention, informing learners of the objectives, stimulating recall of prior learning, presenting the content, providing learning guidance, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer. Together, these instructional events provide teachers with a structured sequence for designing learning experiences that move learners from initial engagement to knowledge acquisition, practice, assessment, and transfer of learning.

Previous research has demonstrated the relevance of Gagné's instructional framework in different educational settings. Amalia and Suryaningtyas (2023) reported that integrating Gagné's instructional events with a problem-solving approach supported students' critical thinking in Mathematics learning. Similarly, Syahrial et al. (2024) found that using Gagné's instructional theory in teaching video analysis supported prospective teachers' understanding of effective instructional practices. These studies suggest that Gagné's nine events provide a useful framework for organising instructional activities and supporting active, structured learning.

The quality of lesson planning is particularly important in pre-service teacher education because lesson plans provide evidence of how prospective teachers translate pedagogical knowledge into intended classroom practice. Developing strong planning competence requires more than selecting classroom activities. Pre-service teachers must be able to sequence instruction, connect learning objectives with teaching strategies, anticipate learner needs, design appropriate assessment, and determine how feedback and transfer of learning will occur.

Fitriati et al. (2023) found that lesson study within school-university partnerships strengthened prospective Mathematics teachers' planning competencies through collaborative planning, observation, and reflection. Iqbal et al. (2021) similarly emphasised the importance of grounding lesson planning in appropriate instructional theories to promote effective teaching and learning.

The continuing relevance of structured instructional frameworks has also been demonstrated in technology-supported lesson design. Jia et al. (2025) explored the use of Gagné's nine instructional events in developing lesson plans generated through large language models. Lee and Zhai (2024) likewise examined the use of ChatGPT to support pre-service teachers in lesson planning and instructional design. These developments indicate that although the tools used to construct lesson plans are evolving, the need for sound instructional design principles remains important. Gagné's framework therefore remains relevant for evaluating whether lesson plans contain the instructional components required to support systematic learning.

Despite this growing body of research, most previous studies have focused on the effectiveness of Gagné-based instruction, professional development, lesson study, or technology-assisted lesson design (Amalia & Suryaningtyas, 2023; Fitriati et al., 2023; Jia et al., 2025; Lee & Zhai, 2024; Syahrial et al., 2024). Less attention has been given to examining how pre-service teachers translate Gagné's instructional theory into the written structure of actual Mathematics lesson plans. This distinction is important because understanding an instructional theory does not necessarily ensure that all of its components are explicitly represented during lesson planning.

Mahama (2023) reported variation in pre-service teachers' application of Gagné's Nine Events of Instruction, indicating that some instructional events may be represented more consistently than others. However, limited evidence remains regarding how the complete sequence of Gagné's nine instructional events is represented specifically in primary Mathematics lesson plans prepared by pre-service teachers. In particular, there is a need to identify which instructional events are consistently planned, which are only partially represented, and which remain insufficiently addressed. Examining these patterns may provide a clearer indication of pre-service teachers' strengths and gaps in instructional planning.

Accordingly, the present study analyses primary school Mathematics lesson plans developed by pre-service teachers using Gagné's Nine Events of Instruction as the analytical framework. Rather than examining classroom implementation, the study focuses specifically on how the nine instructional events are represented within written lesson plans. By identifying patterns of consistent, partial, and limited representation, the study seeks to provide empirical evidence on how pre-service teachers translate instructional theory into lesson planning and to inform improvements in Mathematics teacher education and instructional design.

Research Objectives

This study aims to examine the representation of Gagné's Nine Events of Instruction in primary school Mathematics lesson plans developed by pre-service teachers. Specifically, the study seeks to:

1. identify how Gagné's nine instructional events are represented in primary school Mathematics lesson plans developed by pre-service teachers; and
2. examine the strengths and gaps in the representation of Gagné's nine instructional events across the analysed lesson plans.

Research Questions

The study addresses the following research questions:

1. How are Gagné's nine events of instruction represented in primary school Mathematics lesson plans developed by pre-service teachers?
2. Which instructional events are consistently represented, partially represented, or insufficiently represented across the analysed lesson plans?

Methodology

Research Design

This study employed a qualitative research approach using a document analysis design to examine how Gagné's Nine Events of Instruction were represented in primary school Mathematics lesson plans developed by pre-service teachers. Document analysis was considered appropriate because the study focused on the content and structure of written lesson plans rather than on actual classroom implementation. The lesson plans were treated as pedagogical documents that reflected how pre-service teachers translated instructional knowledge into planned teaching and learning activities.

Document Selection

A total of five primary school Mathematics lesson plans were selected using purposive sampling. The documents were included because they were developed by pre-service teachers for primary Mathematics teaching and contained sufficient information on learning objectives, instructional activities, assessment, and lesson closure to allow systematic analysis using Gagné's instructional framework.

The selection focused specifically on lesson plans that were relevant to the purpose of the study. Documents that did not contain a complete instructional sequence or insufficient information for identifying the instructional events were not considered suitable for analysis. The five selected lesson plans were coded as LP1, LP2, LP3, LP4, and LP5 to maintain anonymity and facilitate systematic comparison across documents.

Unit of Analysis

The unit of analysis consisted of instructional statements, planned teaching activities, assessment activities, teacher actions, and learner activities documented within each lesson plan. These components were examined to determine whether they provided evidence of Gagné's nine instructional events.

The nine events used as the analytical categories were:

1. gaining learners' attention;
2. informing learners of the objectives;

3. stimulating recall of prior learning;
4. presenting the content;
5. providing learning guidance;
6. eliciting performance;
7. providing feedback;
8. assessing performance; and
9. enhancing retention and transfer.

These categories served as an a priori coding framework derived directly from Gagné's Theory of Instruction (Gagné, 1985).

Coding Framework and Content Analysis

The lesson plans were analysed using qualitative content analysis. Each document was reviewed systematically and coded according to the nine instructional events. Evidence within each lesson plan was examined based on both the presence and clarity of the instructional event. To strengthen consistency in interpretation, the representation of each instructional event was classified into three categories: consistently represented, partially represented, and insufficiently represented. An event was considered consistently represented when the lesson plan contained clear and explicit instructional activities corresponding to the intended function of the event. It was classified as partially represented when relevant elements were present but were incomplete, implicit, or insufficiently developed. An event was considered insufficiently represented when there was little or no identifiable evidence corresponding to the instructional event.

For example, *stimulating recall of prior learning* required evidence that learners were deliberately prompted to connect existing knowledge with the new lesson. Simply beginning a lesson with an activity was not automatically considered evidence of prior knowledge activation. Similarly, *providing feedback* required identifiable teacher or peer responses to learners' performance rather than merely checking whether an activity had been completed. *Enhancing retention and transfer* required evidence of activities that encouraged learners to consolidate learning or apply mathematical knowledge in a different or authentic context. The same coding criteria were applied across all five lesson plans to enable systematic comparison.

Analytical Procedure

The analysis was conducted in several stages. First, each lesson plan was read in its entirety to obtain an overall understanding of its instructional structure. Second, relevant instructional statements and activities were identified and coded according to Gagné's nine events. Third, the coded evidence was compared within and across the five lesson plans to identify recurring patterns, similarities, and variations.

A cross-document comparison matrix was subsequently developed to determine which instructional events were consistently represented, partially represented, or insufficiently represented across the lesson plans. Particular attention was given to differences in the depth and clarity with which the instructional events were incorporated. The analysis therefore focused not only on whether an event appeared in a lesson plan but also on how clearly its

instructional purpose was reflected. The findings were then organised according to Gagné's nine instructional events to highlight areas of strength and aspects of lesson planning that required further development.

Trustworthiness of the Analysis

Several procedures were considered to enhance the credibility and dependability of the document analysis. A theory-driven coding framework based on Gagné's Nine Events of Instruction was used consistently across all documents. A coding matrix was maintained to document the evidence used to classify each instructional event, thereby providing an audit trail for the analytical decisions.

The analysis also involved repeated examination and comparison of the lesson plans to ensure that interpretations remained consistent across documents. Particular attention was given to distinguishing between explicit evidence of an instructional event and activities that only indirectly reflected the event. This systematic procedure helped reduce subjective interpretation and strengthened the transparency of the analysis.

Ethical Considerations

The lesson plans were analysed solely for academic research purposes. Identifying information relating to the pre-service teachers was excluded from the analysis, and the documents were coded as LP1 to LP5 to preserve anonymity and confidentiality. The study focused exclusively on the instructional content of the lesson plans and did not report information that could identify individual pre-service teachers. One methodological point still needs to reflect the actual study procedure. If the coding was checked by a second researcher, peer reviewer, or expert, add that under *Trustworthiness*, because an inter-coder or peer-checking procedure would substantially strengthen the credibility of this qualitative document analysis.

Results

The document analysis revealed that Gagné's Nine Events of Instruction were represented unevenly across the five primary school Mathematics lesson plans developed by pre-service teachers. Some events were consistently and explicitly represented, while others appeared only partially or were insufficiently documented. Overall, the strongest representation was found in gaining attention, informing learners of the objectives, presenting content, and assessing performance. In contrast, stimulating recall of prior learning, providing learning guidance, eliciting performance, providing feedback, and enhancing retention and transfer were less consistently represented across the documents.

Event 1: Gain Attention

The first instructional event, gaining learners' attention, was clearly represented across all five lesson plans. A variety of strategies were used, including number observation, questioning, songs, audio stories, visual stimuli, role-play, problem-solving activities, and real-life objects. For example, LP2 used the KUDABATATO song, while LP5 employed a demonstration using two water bottles containing different amounts of water. These activities indicate that the pre-

service teachers generally recognised the importance of engaging learners at the beginning of a Mathematics lesson.

Event 2: Inform Learners of the Objectives

The second event was also consistently represented. The lesson plans generally included clear learning objectives or learning outcomes at the beginning of the lesson. In LP4 and LP5, the objectives were described as measurable, specific, and aligned with the learning standards. This suggests that the pre-service teachers were able to identify and communicate the intended outcomes of the lesson.

Event 3: Stimulate Recall of Prior Learning

The representation of prior learning was less consistent. Some lesson plans included activities that activated existing mathematical knowledge, such as questioning, songs, comparison activities, and references to previously learned procedures. LP4 explicitly activated existing mathematical knowledge, while LP5 used a water-bottle comparison activity that naturally encouraged pupils to recall prior understanding of quantity. However, in several lesson plans, the connection between prior knowledge and new learning remained implicit or superficial. Learners were sometimes asked to recall previous information, but the lesson plans did not always show how this prior knowledge was deliberately linked to the new mathematical concept or skill.

Event 4: Present the Content

Presenting learning content was consistently represented across the five lesson plans. The documents showed explanations, demonstrations, visual representations, conceptual explanations, and sequential presentation of mathematical content. LP3 included step-by-step explanation with a focus on correct procedures, while LP5 used visual examples to make abstract concepts easier to understand. This suggests that presenting mathematical content was a relatively strong component of the lesson plans.

Event 5: Provide Learning Guidance

Learning guidance was represented to varying degrees. Some lesson plans included guiding questions, demonstrations, teacher support, and scaffolding. LP4, for example, included questioning and demonstrations to facilitate understanding, while LP5 described teacher guidance intended to develop pupils' confidence and accuracy. Nevertheless, explicit and systematically planned scaffolding was not evident across all documents. In some cases, teacher guidance appeared to occur during activities rather than being deliberately structured within the lesson plan. This suggests that guidance was present but was not always planned in a sufficiently explicit or progressive manner.

Event 6: Elicit Performance

Opportunities for learners to demonstrate performance were represented through group activities, problem-solving tasks, worksheets, and authentic applications. LP2 included a Tarsia group activity, while LP5 incorporated the "Cabaran Anggar" group activity, in which pupils

analysed images, estimated quantities, justified their answers, and presented their findings. However, the quality of performance elicitation varied. In some lesson plans, tasks appeared to emphasise completion of activities rather than demonstration of conceptual understanding. This indicates that learners were given opportunities to respond and participate, but the activities did not always provide clear evidence of deeper mathematical reasoning.

Event 7: Provide Feedback

Providing feedback was one of the less consistently represented events. Some lesson plans included teacher checking, classroom discussion, questioning, peer checking, group correction, and responses during presentations. LP4 demonstrated relatively richer feedback practices through teacher questioning, whole-class discussion, peer checking, and collaborative correction. In contrast, other lesson plans showed limited or unstructured feedback. LP2, for example, did not contain a clearly planned feedback strategy, while LP3 relied mainly on basic evaluative feedback. Overall, feedback was often general but was not always explicitly designed as formative feedback to support improvement in learning.

Event 8: Assess Performance

Assessment was consistently represented across the lesson plans. Worksheets, individual tasks, group activities, workbook exercises, and teacher monitoring were commonly used to assess pupils' performance. LP4 included an individual worksheet that was submitted for teacher evaluation, while LP5 incorporated workbook exercises completed independently under teacher monitoring. Despite this strength, some assessment activities appeared to focus more on task completion and procedural accuracy than on deeper conceptual understanding. This indicates that assessment was commonly included but not always fully aligned with higher-order mathematical reasoning.

Event 9: Enhance Retention and Transfer

The final event, enhancing retention and transfer, showed considerable variation. Some lesson plans included exit-ticket reflections, reflection sharing, reinforcement of key concepts, and real-world applications. LP4, for instance, encouraged the transfer of learning to authentic budgeting situations, while LP5 used the "Ibu Jari Matematik" activity to encourage pupils to reflect on their understanding.

However, several lesson plans provided only limited evidence of strategies designed to promote long-term retention or transfer of knowledge. In some cases, closure activities focused mainly on short-term review rather than requiring learners to apply mathematical concepts in new or authentic contexts.

Overall Pattern

The cross-document analysis indicates that the five lesson plans were strongest in the early and middle stages of Gagné's instructional sequence, particularly in gaining attention, stating objectives, presenting content, and assessing performance. Greater variation was found in events that required deeper pedagogical planning, including stimulating prior knowledge, providing structured learning guidance, eliciting meaningful performance, providing formative feedback, and promoting retention and transfer.

The findings therefore suggest that Gagné's nine instructional events were not represented uniformly across the lesson plans. Rather than indicating a fixed "level" of application, the analysis shows a pattern of consistent, partial, and insufficient representation across different instructional events.

Discussion

The findings suggest that pre-service teachers demonstrated a basic understanding of structured lesson planning, particularly in instructional events that are commonly and explicitly required in formal lesson-plan formats. Gaining attention, informing learners of objectives, presenting content, and assessing performance were more consistently represented across the five documents. These events are relatively visible and straightforward to document because they can be expressed through set induction activities, stated learning outcomes, content explanations, and assessment tasks.

The stronger representation of these elements supports the view that pre-service teachers are generally able to organise the main structure of a Mathematics lesson. This is consistent with previous studies highlighting the importance of lesson planning competence in preparing prospective teachers to connect learning objectives, instructional activities, and assessment (Fitriati et al., 2023; Iqbal et al., 2021). It also reflects the systematic structure proposed by Gagné (1985), in which instruction begins with attention and objectives before progressing toward content presentation and learner assessment.

However, the weaker representation of stimulating prior learning suggests that pre-service teachers may not always make explicit connections between what pupils already know and the new mathematical content being introduced. Although several lesson plans included questioning or recall activities, these were not always clearly linked to the intended learning outcomes. In Mathematics education, such connections are important because new concepts often build directly on prior conceptual and procedural knowledge. The findings therefore suggest that pre-service teachers may require greater support in planning purposeful prior-knowledge activation rather than relying on general recall activities.

A similar issue was found in the provision of learning guidance. Although demonstrations, questioning, and teacher support were present in several lesson plans, explicit scaffolding structures were not consistently documented. Effective learning guidance requires more than teacher assistance during an activity. It involves deliberately sequencing support, providing worked examples, guiding learners through increasingly complex tasks, and gradually reducing assistance as competence develops. The findings imply that some pre-service teachers may understand the need to support learners but may not yet be planning this support systematically.

The findings concerning eliciting performance also reveal an important distinction between learner participation and evidence of learning. Group work, worksheets, and classroom activities were widely represented, but some tasks appeared to emphasise completion rather than conceptual understanding. Gagné's framework requires learners to demonstrate what they have learned through meaningful performance. Therefore, lesson planning should include tasks that allow pupils to explain reasoning, apply mathematical concepts, justify solutions, and demonstrate transfer rather than simply complete exercises.

Providing feedback emerged as another area requiring improvement. While some lesson plans included teacher checking, peer discussion, and questioning, feedback was often basic and evaluative rather than formative. This suggests that pre-service teachers may view feedback as confirming whether an answer is correct rather than as a process of helping learners understand errors and improve future performance. More explicit planning of feedback criteria, success indicators, peer-feedback structures, and corrective guidance could strengthen this instructional event.

The relatively weak representation of retention and transfer is also significant. Several lesson plans included reflection or closure activities, but only some provided clear opportunities for learners to apply mathematical knowledge in new or authentic contexts. Gagné's final instructional event emphasises helping learners retain and transfer knowledge beyond the immediate lesson. In Mathematics education, this may involve real-life problem solving, application tasks, homework in authentic contexts, or opportunities to connect concepts across topics. The findings suggest that this aspect of lesson planning needs greater emphasis in pre-service teacher education.

Overall, the study indicates that the pre-service teachers were able to represent the more visible structural components of lesson planning but showed greater variation in instructional events requiring deeper pedagogical reasoning. This finding is consistent with the broader literature suggesting that lesson planning competence develops through guided practice, reflection, and explicit engagement with instructional theory (Fitriati et al., 2023; Syahrial et al., 2024). It also supports the need for teacher education programs to move beyond introducing instructional models conceptually and provide structured opportunities for pre-service teachers to apply such models directly to lesson-plan development.

The findings therefore have practical implications for Mathematics teacher education. Specific training could focus on designing purposeful prior-knowledge activation, planning explicit scaffolding, creating performance tasks that demonstrate conceptual understanding, embedding formative feedback, and designing activities that promote retention and transfer. Clear lesson-planning guidelines based on Gagné's Nine Events of Instruction may help pre-service teachers translate instructional theory more consistently into written pedagogical plans.

Conclusion

This study examined how Gagné's Nine Events of Instruction were represented in primary school Mathematics lesson plans developed by pre-service teachers. The findings showed that several instructional events, particularly gaining attention, informing learners of the objectives, presenting content, and assessing performance, were represented more consistently across the analysed lesson plans. In contrast, stimulating recall of prior learning, providing learning guidance, eliciting performance, providing feedback, and enhancing retention and transfer were represented less consistently and, in some cases, only implicitly.

The findings therefore suggest that the lesson plans demonstrated a partial and uneven representation of Gagné's instructional framework rather than a uniform level of application. The pre-service teachers appeared more able to document the visible structural components of lesson planning than instructional events that require deeper pedagogical reasoning, such as explicit scaffolding, formative feedback, and transfer of learning. This indicates a need for

greater emphasis on how instructional theory can be translated into detailed and purposeful lesson-planning decisions.

Teacher education programmes should provide more structured guidance and practical training to strengthen the use of Gagné's instructional events in Mathematics lesson planning. For stimulating recall of prior learning, pre-service teachers may incorporate short review activities, such as quick quizzes or Think-Pair-Share tasks, that explicitly connect prior knowledge with the new lesson. To strengthen learning guidance, worked examples followed by partially completed examples may be used to provide gradual scaffolding. Eliciting performance may be enhanced through differentiated tasks that require learners to explain, justify, and apply mathematical ideas rather than merely complete activities.

The provision of feedback should also be planned more explicitly through formative strategies such as feedback rubrics, checklists, guided questioning, peer feedback, and corrective comments that help learners understand how to improve their performance. Similarly, retention and transfer can be strengthened through authentic tasks that require pupils to apply mathematical knowledge in real-life situations beyond the immediate lesson.

Overall, the study highlights the value of using Gagné's Nine Events of Instruction as a practical framework for strengthening lesson-planning competence among pre-service Mathematics teachers. However, the findings are limited to five analysed lesson plans and reflect written planning rather than actual classroom implementation. Future studies could combine document analysis with classroom observation, interviews, or reflective discussions to examine how the instructional events are enacted in practice.

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