

# The Effectiveness of Just-In-Time Delivery of Learning Materials in Improving Classroom Efficiency and Enhancing Student Learning Outcomes

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**Abstract:** Classroom instruction often struggles to meet the different levels of student readiness, especially within limited time. Pre-planned lessons are not always flexible enough to address immediate learning gaps, which can affect lesson flow, student engagement, and overall learning outcomes. This study explored the effectiveness of Just-In-Time (JIT) delivery of learning materials in improving classroom efficiency and student learning outcomes at Talavera Senior High School. A qualitative descriptive case study design was used to understand how timely instructional support influences students' engagement, comprehension, and motivation. Data were collected through a researcher-made questionnaire, classroom observations, and participant profiles involving selected students and teachers who had direct experience with JIT-based instruction. The findings showed that students became more engaged and motivated when learning materials were provided exactly when they were needed. Immediate explanations and targeted resources helped them better understand the lessons, correct their mistakes more quickly, and stay focused during class activities. Teachers also observed smoother lesson flow and improved responsiveness to learners' needs when using JIT strategies. The study concludes that the Just-In-Time delivery of learning materials is an effective approach to addressing diverse learning needs, supporting adaptive teaching practices, and improving overall classroom efficiency. These results suggest that integrating JIT strategies into classroom instruction can help create more responsive and learner-centered learning environments.

**Keywords:** Classroom Efficiency, Just-In-Time Learning, Instructional Responsiveness, Student Engagement, Learning Outcomes.

## 1. Introduction

One of the continuing challenges in classroom instruction is ensuring that learners receive the support they need at the appropriate time. Despite careful lesson planning, learners progress at different rates. Some students quickly grasp new concepts and move forward with ease, while others require additional time to revisit prior knowledge before they can fully engage with new material. These differences are expected in

any classroom setting; however, they may create learning gaps that affect the overall flow of instruction. As a result, materials prepared in advance do not always align with students' immediate learning needs during a given class session.

The Just-In-Time (JIT) delivery of learning materials offers a practical approach to addressing these variations. Rather than presenting all instructional resources at the beginning of a lesson or relying entirely on pre-prepared modules, teachers provide targeted materials only when they become necessary. The timing of these materials is informed by ongoing assessment strategies, such as quick checks for understanding, observation of student errors, and analysis of student responses during class discussions. When instructional support is delivered at the point of need, lessons become more focused, cognitive overload is minimized, and connections between prior knowledge and new concepts are strengthened. This approach also enables teachers to make immediate adjustments, ensuring that instruction remains responsive to students' actual level of understanding.

More broadly, the use of Just-In-Time delivery promotes a flexible and adaptive learning environment. It encourages teachers to continuously monitor student progress and adjust their instructional strategies accordingly, rather than strictly adhering to a predetermined sequence of activities. Such flexibility supports learners who require additional assistance while also providing opportunities for more advanced students to extend their understanding without being constrained by the pace of the class.

This study examines the use of Just-In-Time learning materials as a strategy to improve classroom efficiency and enhance learner learning outcomes. Specifically, it investigates how the timing of instructional support influences lesson flow, learner engagement, and academic performance. The study seeks to determine whether providing materials at the point of need can more effectively address learning gaps, strengthen

comprehension, and support more efficient classroom management. Through this analysis, the study aims to contribute to the ongoing development of responsive and learner-centered teaching practices.

## 2. Review Related Literature

In recent years, Just-In-Time (JIT) learning has gained increasing attention as an approach that supports real-time understanding in classroom instruction. Rather than providing all learning materials at once, JIT enables teachers to deliver resources at the point when they are most needed. This approach allows students to engage more effectively with lesson content and maintain focus on essential concepts. Fischer and Franken (2020) emphasized that JIT strategies are particularly effective in fast-paced learning environments, where gaps in understanding can emerge quickly and require immediate attention.

Several studies highlight the importance of addressing students' varying levels of readiness. Martin, Stamper, and Cook (2020) found that real-time instructional support enhances student focus, particularly when the content directly responds to areas of difficulty. Similarly, Andersen (2021) reported that on-demand learning materials facilitate faster mastery of concepts, as students receive guidance at the exact moment it is required.

Immediate feedback is also recognized as a critical factor in improving learning outcomes. Hattie and Clarke (2020) explained that feedback is most effective when provided immediately after task completion, as it allows learners to correct errors while the learning experience is still active. Supporting this view, Osman (2022) demonstrated that JIT-based explanations are beneficial for learners who require additional support during ongoing lessons.

In addition, JIT approaches contribute to more efficient classroom management and smoother lesson flow. Zhang, Yu, and Liu (2021) observed that learners process information more effectively when instructional activities are adjusted based on their immediate needs. Wong and Li (2023) further noted that teachers are able to use instructional time more efficiently, as unnecessary content delivery is minimized.

Learner motivation has also been found to improve when lessons are perceived as relevant and responsive. Bawa and Watson (2021) reported increased participation when instructional materials directly address learners' current challenges. Likewise, Rodriguez and Lao (2022) found that learners demonstrate higher engagement in classrooms that utilize adaptive or JIT-based learning resources.

The integration of technology has significantly supported the implementation of JIT instruction. Chung, Subramaniam, and Dass (2022) explained that digital tools, such as learning management systems, formative assessments, and real-time feedback mechanisms, enable teachers to identify learning gaps more efficiently. These tools provide timely data that inform the preparation and delivery of targeted instructional materials.

Local studies in the Philippine context further support the effectiveness of timely instructional interventions. Dela Cruz (2021) found that Filipino learners benefit from real-time support due to the wide variation in readiness levels within classrooms. Similarly, Rivera (2023) reported that the use of JIT learning materials enhances both student mastery and participation, particularly in environments that incorporate modular and digital modes of instruction.

## 3. Methodology

### A. Research Design

This study adopted a qualitative-descriptive case study design. This type of research is appropriate for describing real-life situations, experiences, and processes in a clear and detailed manner. Instead of relying on numerical data or experimental procedures, a qualitative-descriptive approach focuses on observations and insights gathered from actual classroom settings.

The case study design was selected to examine how Just-In-Time (JIT) learning materials are utilized in classroom instruction and how they address learners' immediate learning needs. This approach allowed the researchers to observe real classroom situations and better understand how JIT materials affect learner engagement, comprehension, and the overall flow of the lesson.

### B. Research Locale

The study was conducted at Talavera Senior High School, located in Talavera, Nueva Ecija. This setting was chosen due to its diverse population of learners with varying levels of academic readiness, making it suitable for examining the application of Just-In-Time (JIT) learning materials in actual classroom environments.

The school's teaching practices and learners' characteristics matched the needs of the study. This allowed the researchers to observe how timely instructional support is applied in real situations and how it affects both teaching and learning.

### C. Population and Sampling

The target population consisted of selected learners and teachers from Talavera Senior High School who were directly involved in classroom instruction where Just-In-Time (JIT) learning materials were implemented. This included learners from selected classes and teachers responsible for facilitating instruction and monitoring student readiness.

A purposive sampling technique was used to select participants based on their availability during the data collection period. A total of 20 participants were included in the study, consisting of 5 teachers and 15 learners. This group was chosen to get both teacher and student views on the use of Just-In-Time learning materials.

### D. Research Instrument

The main research instruments used in this study were a researcher-made questionnaire and an observation checklist.

The questionnaire was used to measure how learners' assess the effectiveness of Just-In-Time (JIT) learning materials in the classroom. It consisted of four sections: (1) student engagement, (2) understanding and comprehension, (3) classroom efficiency, and (4) instructional responsiveness. Each section contained five statements, with a total of twenty items. A five-point Likert scale was used to gather responses, with the following values: 5 – Strongly Agree, 4 – Agree, 3 – Neutral, 2 – Disagree, and 1 – Strongly Disagree.

In addition to the questionnaire, an observation checklist was used to record actual classroom behaviors during the use of JIT learning materials. This allowed the researchers to validate the responses by observing learners' engagement, teachers' responsiveness, and overall classroom interaction during the lesson. Both instruments were developed by the researchers and aligned with the objectives of the study.

#### E. Data Collection

The data gathering process started after securing permission from the administration of Talavera Senior High School. Once approved, the researchers selected the participants using purposive sampling, ensuring that only those directly involved in JIT-based instruction were included in the study.

The questionnaire was personally given to the selected respondents during their available class schedule. Respondents were given sufficient time to accomplish the questionnaire. Prior to answering the questionnaire, the purpose of the study was explained, and the participants were informed that their participation was entirely voluntary. After completion, the researchers collected all the forms on the same day to ensure proper documentation. Confidentiality of the respondents was strictly maintained. No personal identities were disclosed in any part of the study. All responses were kept confidential and used only for academic purposes.

#### F. Data Analysis

The data collected from the respondents were carefully organized, tallied, and encoded. The data were then analyzed using weighted mean to determine the level of agreement of the respondents regarding the effectiveness of Just-In-Time (JIT) learning materials. The results were then interpreted based on the computed weighted mean.

Formula Used:

$$\bar{X} = \frac{\sum fx}{N}$$

Where:

$\bar{X}$  = Weighted Mean

f = Frequency of Responses

x = Weight of Each Scale Value

N = Total Number of Respondents

The interpretation of results followed this scale:

Range	Interpretation
4.21 – 5.00	Strongly Agree
3.41 – 4.20	Agree

2.61 – 3.40	Neutral
1.81 – 2.60	Disagree
1.00 – 1.80	Strongly Disagree

This statistical treatment allowed for a clear interpretation of respondents' perceptions in terms of engagement, comprehension, classroom efficiency, and instructional responsiveness.

## 4. Results and Discussion

This chapter presents and discusses the results gathered from the respondents about the effectiveness of Just-In-Time (JIT) learning materials in classroom instruction. The discussion is arranged based on the four indicators used in the study.

### A. Learner Engagement

The results show that students were highly engaged when Just-In-Time (JIT) learning materials were used in class. Most students said they became more attentive and more active in participating during discussions when materials were given based on what they needed at the moment.

The computed weighted mean is 4.79, which is interpreted as Strongly Agree. This means that JIT learning materials help improve students' attention, participation, and interest in the lesson.

Overall, the findings suggest that learners respond better when learning support is provided at the right time, helping them stay focused throughout the discussion.

### B. Understanding and Comprehension

The results show a strong positive response. Respondents agreed that they were able to understand lessons better when explanations and examples were provided during the discussion. The weighted mean of 4.74, interpreted as Strongly Agree, indicates that JIT learning materials help students understand concepts more clearly and lessen confusion during lessons. This implies that immediate clarification during instruction plays an important role in improving students' understanding of difficult topics.

### C. Classroom Efficiency

The findings reveal that the use of JIT learning materials help improve classroom efficiency. Respondents agreed that lessons flow more smoothly when materials and explanations are provided based on learners' needs during the class. The weighted mean of 4.70, interpreted as Strongly Agree, indicates that JIT strategies help maximize class time and reduce unnecessary repetition of lessons. This suggests that timely instructional support allows teachers to manage lessons better and keeps the flow of instruction more organized.

### D. Instructional Responsiveness

The results show that teachers are able to adjust their instruction based on the immediate needs of learners. Respondents agreed that teachers give support and clarification whenever students experience difficulties during lessons. The

weighted mean of 4.75, interpreted as Strongly Agree, shows that JIT learning materials support more flexible and responsive teaching. This implies that teachers become more aware of learners' learning needs and can respond right away during instruction.

Overall, the results show that Just-In-Time (JIT) learning materials are very effective in improving classroom instruction. All indicators were rated as Strongly Agree, which means the respondents have a very positive view of its use.

#### E. Recommendations

Based on the findings of the study, the following recommendations are proposed to further improve the effectiveness of Just-In-Time (JIT) learning materials in classroom instruction:

##### 1) For Teachers

Teachers are encouraged to continue using Just-In-Time (JIT) learning materials during classroom instruction, especially when addressing students' immediate learning needs. Providing timely explanations, examples, and learning support can help maintain student engagement and improve understanding of lessons. Teachers may also consider varying their instructional strategies to better respond to different levels of student readiness.

##### 2) For School Administrators

School administrators are encouraged to support the implementation of JIT strategies by providing necessary resources such as instructional materials, teaching guides, and access to digital tools. Training and workshops may also be conducted to help teachers strengthen their skills in delivering timely and responsive instruction. Supporting collaboration among teachers can further improve the sharing of effective classroom practices.

##### 3) For Learners

Learners are encouraged to actively participate in classroom discussions and openly communicate their learning difficulties. By doing so, teachers can immediately provide appropriate support and clarification. Active engagement from learners is essential in maximizing the effectiveness of JIT learning materials.

##### 4) For Future Researchers

Future researchers may expand this study by including a larger number of respondents or conducting the research in different schools and grade levels. It is also recommended to explore the integration of technology-based tools in Just-In-Time learning to further enhance its effectiveness. Additionally, quantitative or mixed-method approaches may be used to strengthen and validate the findings of this study.

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