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NEEDS ANALYSIS FOR DEVELOPING AN INQUIRY - BASED LEARNING INSTRUCTIONAL MODULE ON THE TOPIC OF GRAVITATION FOR SECONDARY SCHOOLS

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Abstract: *This is a need analysis study in the first stage of Design and Develop Research (DDR). The purpose of this study was to identify the needs on developing Inquiry Based Learning (IBL) instructional module on Gravitation topic for secondary school in Malaysia. The study was done qualitatively using a semi-structured interview method with four physics teachers chosen through a purposive sampling technique. The data was analysed using thematic analysis, and the results were displayed as thematic maps. The study discovered four major themes:(1) the significance of learning gravitation topic, (2) Issues in teaching and learning gravitation topic, (3) applied instructional strategies in gravitation topic, and (4) Desired enhancement for instructional strategies in gravitation topic. The study's findings suggest that IBL instructional module for Gravitation topic is required. This module has the potential to establish a student-centered learning environment that includes the key elements of 21st century learning: critical thinking, creativity, communication, and values. Furthermore, teachers can modify the instructional approaches utilised in the classroom to teach the concept of gravitation by guiding module development. Teachers can also refine their instructional methods for teaching the concept of gravitation by referring to the developed module.*

Keywords: *Need analysis, Module, Inquiry based learning Gravitation, Physics subject*

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Introduction

Malaysia's education system is rapidly changing as the global economy evolves in the 21st century. Several curriculum modifications outlined in the Malaysian Education Blueprint 2013-2025 have been undertaken to ensure that the education system operates properly and in accordance with international educational standards (Ministry of Education, 2013). The Malaysian Secondary School Standard Curriculum (KSSM), which was developed based on international standards, was introduced in 2017 to replace the previous curriculum. The enhanced curriculum standards for the Physics syllabus include the introduction of gravitation as a new topic, developed under the three learning areas. New concepts, such as Newton's law of universal gravitation and Kepler's law, were introduced as part of this updated content (Ministry of Education, 2018).

Problem statement

According to Frappart, Raijmakers and Frède (2014), understanding gravity was challenging due to the presence of invisible forces, and Syuhendri (2019) also found that student teachers face misconceptions in grasping the concept of gravity. Teachers frequently face the challenge of teaching the concept of Kepler's law in describing the motion of planets orbiting the Sun because students must describe the movement of the planets and have a thorough understanding of the theory without being able to see what happens to planets around the Sun (Yu, Sahami & Denn, 2010). Moreover, according to Abdul Halim and Nur Jahan (2022), highlights that the absence of effective teaching and learning methods hinders students' interest in the topic of gravity, leading to generally low levels of higher-order thinking skills among Malaysian students (Mohd Shahali et al., 2018). In Malaysia, physics is an elective subject that students can choose to study during the final two years of their upper secondary school. Learning physics is about explaining the fundamental nature of the universe in the simplest way possible (Bao & Koenig, 2019. However, physics subjects are regarded tough because the concept is abstract and requires a clear understanding of the theory a thorough comprehension (Markus et al., 2021; Angell et al., 2004). In a study investigating the views of high school students and teachers about physics, it was found that while students perceive physics as "difficult but interesting, "teachers emphasized that understanding physics concepts requires strong mathematical competency, which many students lack (Lee & Sulaiman, 2018). This finding is supported by Ekici (2016), who found the students' not being able to connect the subjects and the concepts of physics because of insufficient mathematics knowledge.

This pedagogical challenge aligns with broader concerns regarding Malaysia's declining performance in global educational assessments. The Trends in International Mathematics and Science Study (TIMSS) reported a concerning decline in Malaysian students' science scores, particularly in cognitive domains such as knowledge, application, and reasoning, in TIMSS 2023 compared to 2019. Researchers have attributed this trend to insufficient emphasis on critical thinking skills in classroom instruction (Areepattamannil, 2021; Kaur & Leong, 2022; Phang et al., 2020). Similarly, only 58.45% of candidates in the 2024 Sijil Pelajaran Malaysia (SPM) examination demonstrated mastery of Higher-Order Thinking Skills (HOTS), reflecting limited competency in solving complex problems (Ministry of Education Malaysia, 2025). To address this gap, continuous efforts to integrate HOTS through effective pedagogical strategies are urgently required (Ministry of Education Malaysia, 2025). Therefore, there is a critical need to design and implement instructional approaches that enhance conceptual understanding, foster student engagement, and promote higher-order thinking, particularly in abstract science topics such as gravity.

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Literature review

The teacher's role is to create an engaging classroom environment by using strategies and approaches that promote active learning among student (Sonte & Sharif, 2021; Bunyamin et al., 2020). Similarly, IBL is one of the most effective student-centered approaches for developing students' analytical thinking and cognitive skills, as well as for actively facilitating knowledge transfer and enhancing critical thinking (Wale & Bishaw, 2020; Wartono, Hudha & Batlolona, 2018) actively transferring information and improving thinking skills (Rahmi, Alberida & Astuti, 2019). However, Khalaf and Zin (2018) argued that most teachers are still unaware of how to completely integrate IBL because traditional teaching methods are more comfortable. IBL implementation is still limited due to teachers' conceptual grasp of the use of the inquiry approach being ambiguous and confusing (Ong, 2021). To achieve the focus in new curriculum's standards, teacher must be exposed to IBL implementation approach (Fernandez, 2017; Ministry of Education, 2013). Students involved in IBL develop essential research skills, such as finding reliable sources, gathering data, and evaluating evidence (Zubaidah et al., 2017). These skills are valuable not only in academics but also in real-world problem-solving (Shanmugavelu, 2020). Hence, it is imperative to develop an instructional and educational module that can effectively demonstrate to teachers and students the process of implementing IBL while integrating 21st century learning principles. This will result in a more profound and significant learning experience for students.

Studies on the implementation of the Inquiry-Based Learning (IBL) approach in Malaysia have predominantly focused on primary school students (Jumaat, 2022; Ong et al., 2021; Rozali & Abdul Halim, 2020; Rubani et al., 2018). Therefore, this study aims to analyse the need for developing an inquiry-based teaching and learning module at the secondary school level. The researcher found that there remains a lack of research on the implementation of the IBL approach at the secondary level, particularly in the subject of Physics. Accordingly, a study focusing on the application of the IBL approach among secondary school students especially in Physics is necessary to evaluate its effectiveness in enhancing students' achievement in the subject.

Need Analysis

The study utilises the Design and Development Research (DDR) approach. Its primary aim is to determine the needs for developing an Inquiry-Based Learning (IBL) instructional module for teachers. This module specifically focuses on the topic of Gravitation, which is included in the upper secondary school physics syllabus in Malaysia. According to Richey and Klein (2007), the DDR approach is a systematic process comprising three phases: needs analysis, design and development, and evaluation. The initial phase of DDR involves conducting a needs analysis. McKillip's Discrepancy Model (1987) provides the foundation for examining and comparing actual conditions with expected outcomes. As noted by McKillip (1987), the needs analysis phase involves identifying and assessing the needs of the target group, which in turn informs the intended learning outcomes. Identifying and analysing needs is essentially the process of recognising existing problems and proposing appropriate solutions (Jamel, Ali & Ahmad, 2019).

Method

The semi-structured interview method was used during the analysis phase. It was employed to obtain comprehensive and in-depth information by eliciting responses from the study informants (Creswell & Creswell, 2018). This approach also enables the researcher to identify the underlying causes of problems that arise within the study context and to take appropriate

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actions to address them (McKillip, 1987). In this phase, purposive sampling was employed to select informants for the interview sessions. Four informants were selected, all of whom are experienced physics teachers currently teaching the subject at secondary schools. Table 1 provides a detailed overview of the background information related to the research informants.

Table 1: Research profile Informant

Informant	Education background	Teaching Subject	Experience in teaching physics
Teacher 1(T1)	Bachelor's Degree (Honors) in Physics Education	Physics	27 years
Teacher 2(T2)	Bachelor's Degree (Honors) in Physics Education	Physics	20 years
Teacher 3(T3)	Master of Education	Physics	18 years
Teacher 4(T4)	Master of Education	Physics	14 years

The needs analysis was conducted using a semi-structured interview method comprising 10 questions. The interview protocol was reviewed and validated by three experts to ensure alignment with the research questions and objectives. Informants were notified in advance of the scheduled interview, which was expected to last at least 30 minutes. Upon mutual agreement regarding the date and time, the researcher conducted individual interviews via the online platform Google Meet. Each interview session was audio-recorded to facilitate accurate transcription by the researcher. After the transcription was completed, the informants were asked to review and validate the transcripts prior to the thematic analysis. A deductive thematic analysis approach was employed to analyse the data. The main themes were identified based on the Discrepancy Model and informed by the interview questions. Thematic analysis was conducted manually, following Braun and Clark (2006) six-phase framework, as illustrated in Figure 1.

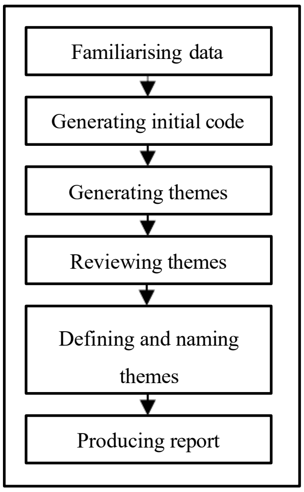

Figure 1: Thematic analysis phases in the study

The data from Table 2 is visualised as a thematic map, following the approach described by Braun and Clark (2006, which is shown in the results section. The researcher conducted an inter-rater reliability assessment involving two experts to evaluate the consistency of the identified themes, using the average agreement value as the primary indicator. Subsequently, the level of agreement was calculated using Cohen's Kappa index to validate the consistency of data interpretation.

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Table 2: Code generated from the interview transcripts with themes and sub themes.

Codes generated from the interview transcripts	Sub-themes	Themes
• A foundation subject in classical physics. • Gaining new concept. • Introduce the universe's reality	Addition knowledge	1)The significance of studying Gravitation topic
• Prior knowledge. • Phenomenology • Suggested themes from low-secondary science. • Take an interest in aviation and astronomy.	Application	
• Student cannot distinguish between linear velocity and escape velocity • Wrong concepts. • Students applied incorrect formulas • Student cannot distinguish Kepler's law	Misconception	2)Issues in teaching and learning Gravitation topic
• The topic encompasses several formulae • Abstract concept • Involving earth science	Nature of gravitation topic	
• Students frequently rely on rote memorization for understanding the concepts • They have a weakness in logical reasoning.	Lack of thinking skills	
• Teachers are less confident teaching new topic • Lack exposure and training for new topic • Lacking in teaching aids • Time constraint in providing teaching aids	Teacher's readiness	
• Centripetal force • Kepler's first law activity • Connect a concept with real life	Hands on activity	3)Applied instructional strategies in Gravitation topic
• Utilize textbook to explain the content • Use exercises from simple modules for calculation and problem-solving question • Teaching aids using power point presentation	Teacher centered	
• Role play • Gallery walks • Hands-on • 21st century learning style • Project based learning • Problem based learning	Student centered	4)Desired enhancement in instructional strategies
• Video for induction set • Use online sources and application such as Google	Utilize Information, communication	

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• Instagram • YouTube to see the real situation in outer space relate on the gravitation topic	& Technology (ICT)
• Instructional module for teaches more proficient in teaching this topic • Modul focuses on problem solving and reasoning	Module usage

Results

Based on the study's findings, thematic analysis produced the following four themes:

1) The significance of studying Gravitation topic;
2) Issues in teaching and learning Gravitation topic;
3) Applied instructional strategies in Gravitation topic; and
4) Desired enhancement in instructional strategies for Gravitation topic

Theme 1: The significance of studying Gravitation topic

All informants agreed that the significance of the Gravitation topic in the new KSSM Physics syllabus lies in its alignment with the current and future needs of students, employers, and society (Bao & Koenig, 2019). This alignment ensures that students receive a high-quality education that meets their academic and professional needs, adheres to international standards and best practices, and prepares them to be globally competitive (Jamel, Ali & Ahmad, 2019; Ministry of Education, 2013). Two codes were generated in relation to the significance of learning the Gravitation topic. These codes reflect the acquisition of additional knowledge in physics and its practical applications, as summarised in Figure 2.

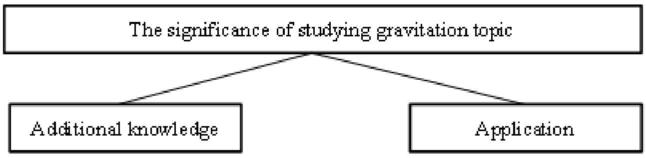

Figure 2: Theme of the significance of studying Gravitation Topic

The first theme highlights the significance of studying the topic of Gravitation. Based on the interview findings, this topic contributes to the expansion of students' knowledge in areas where they already possess prior understanding from lower secondary science subjects.

> *In the lower secondary school science subject, this topic is at the end of the final topic in form 2 and form 3, elements related to gravity are introduced, which student have learned in form 2 science subject such as galaxies, stars and solar, so people have existing knowledge about the position of the planets that they will use this knowledge in form 4 gravitation topic. So, the existing knowledge is already there..."(T1)*

> *"... The topic of "Earth Science" has been introduced in the Lower Secondary Sciences subject in Form 1 to Form 3 Science..." (T2)*

Two informants stated that students showed a positive response toward learning and understanding planetary and universal science, which in turn fosters interest in pursuing STEM-related careers such as astronomy and aeronautical engineering. This finding is consistent with

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the study conducted by (Razali, 2021), which found that students' attitudes toward STEM significantly influence their interest in STEM careers.

"... So here it involves not only two planets but also satellites. So, it is more in-depth and in fact if they are interested in this topic, they will be more interested in being able to cultivate an interest in astronomy..." (T2)

"... helping them to develop sense of interest to know more and maybe one day they will have the opportunity to work at NASA or even in our own country, in the nuclear center of the country, or even that involves aeronautics..." (T3)

The second code, which is application, refers to the introduction of physics formulas involving the processes of proving, analysing, and applying these formulas. This suggests that students must develop reasoning skills and higher-order thinking skills (HOTS) (Sokolowski, 2021). According to Marnah, Suharno, and Sukarmin (2022), higher-order thinking is a cognitive process that involves deliberate mental engagement with complex and reflective experiences, carried out consciously to achieve the goal of acquiring knowledge. This process encompasses analytical, synthetic, and evaluative thinking, and includes mental operations such as classification, induction, deduction, and reasoning.

"... One of the notable differences is that in this topic of gravity, it has a higher level of analysis, where the student will be asked to combine two or more formulas to publish a new formula..." (T3)

"... For example, student needs to combine the formula "Newtons Universal Law of Gravitation" with a formula called "Newton's second law of motion" to produce a new formula, namely the formula of the centripetal force..."(T1)

The basis of this topic can also be linked to the phenomenological perspective, where students' prior knowledge is closely related to real-life scenarios encountered in their environment. Teachers believe that by exploring this topic, students will be able to apply their existing knowledge and cultivate a deeper interest in the science of astronomy. In conclusion, the study's findings indicate that this topic is essential to explore, as it represents a significant enhancement in the area of mechanics within the KSSM Physics curriculum.

Theme 2: Issues in teaching and learning Gravitation topic

The second theme concerns the issues related to the teaching and learning of the Gravitation topic. Based on the interview sessions, four codes emerged under this theme: the nature of the Gravitation topic, misconceptions, lack of thinking skills, and teacher readiness, as illustrated in Figure 3 below.

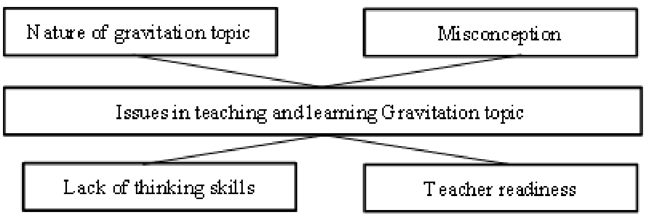

Figure 3: Issues in teaching and learning Gravitation topic

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Based on the interviews conducted, two informants faced the same issue, where students found this topic difficult due to the abstract nature of the topic on gravitation and has many formulas.

> *"…Because students cannot see it. This is something invisible, whereas other topics we teach have a physical, visible nature…" (T1)*

> *"…The issue is that students cannot get a clear picture. In physics, they are learning something that cannot be seen with the naked eye…" (T2)*

(T3) stated that students consider this topic challenging to understand because they must analyse many formulas. This statement is supported by (T4).

> *"…But the difficulty lies more in the use of formulas, as there are many, and they are quite similar. Often, they misunderstand and use the wrong formula…" (T4)*

Based on the interviews, all informants reported a common issue: students exhibited misconceptions regarding the application of physical formulas discussed in this topic. The topic encompasses two laws with multiple formulas that must be understood and mastered before they can be applied to problem-solving situations. Although students are not required to memorise these formulas as they are typically provided in the question many still struggle to determine which formula to use based on the context and instructions provided. According to Syuhendri (2019), misconceptions can be defined as inconsistencies between students' ideas and formal scientific explanations. These misconceptions often occur when students become confused during the learning process due to the number of formulas introduced (Aykutlu, Bezen & Bayrak, 2015).

> *"…It is filled with formulas that can be said to be complicated because it has many variables and vary in physics quantities. And it has many types of formulas that look the same..."(T4)*

> *"... Students have a problem that they don't like with a lot of formulas or a problem with publishing formulas, they may feel that this topic is difficult for them..." (T3)*
> *"... But the difficulty is more in the use of formulas because there are many formulas and all are more or less the same and often, they have the wrong concept and use the wrong formula..."(T2)*

All informants agreed that the Gravitation topic contains numerous physical formulas that must be applied in problem solving tasks. Confusion in selecting the appropriate formula is a common issue, which hinders students from mastering calculation-based questions. This difficulty arises because students are often unable to apply and analyse the given formulas to effectively solve numerical problems. According to Bao and Koenig (2019), students who struggle with mathematical problem solving tend to lack essential thinking skills, including reasoning.

> *"... Actually, what they have learned in algebraic mathematics, when applied in physics in the publication of formulas, they cannot see that it has a correlation it has a relationship..." (T3)*

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> *"... In fact, if we give an example, if we have taught a full chapter, then we give a complete list of formulas, it is difficult for students to choose which formula they need to use..."(T4)*

The final code refers to teacher readiness. Teachers encounter challenges with this topic, as it is a newly enhanced component of the revised curriculum. All informants agreed that teachers are not yet confident in teaching the Gravitation topic due to limited exposure to training that would deepen their understanding. This finding supports the study by Markus (2021), which found that teachers require professional training to enhance their pedagogical knowledge, ensuring that learning becomes more accessible to students, particularly for new topics introduced in the current curriculum. Furthermore, all informants agreed that since the Gravitation topic was only introduced in 2020, teachers continue to face limitations in the availability of appropriate teaching resources. They strongly agreed that the use of a specific instructional module as a teaching aid is essential for this topic, given its complexity and the need for a comprehensive understanding of effective instructional strategies and appropriate methods for delivering lesson content.

> *"... It is just that personally for me, i feel that this topic is still new, the first year I taught this topic in 2020. I frankly still have problems in the calculation section involving which the formula is the err relationship between the formulas and when applied in the calculation question, i still have a little problem which is not able to identify which formula is suitable to use..."(T3)*

> *"...The specific module for this topic of gravitation is still incomplete. So, if there is, which it can cover for subtopic 1, subtopic 2 and subtopic 3, I think it is very helpful for students to master this topic of gravity more..."(T3)*

> *"... When we have more modules, teachers can choose which approach is more appropriate..."(T4)*

Theme 3: Applied instructional strategies in Gravitation topic

The third theme focuses on the instructional strategies employed by teachers in delivering the Gravitation topic. Beginning in 2021, during the COVID-19 Movement Control Order (MCO), teachers initially relied solely on digital textbooks and PowerPoint slides to conduct online instruction. In the second and third years, teachers transitioned to face-to-face instruction for this topic. Based on the interview data, two codes were identified that describe the teaching and learning methodologies used by teachers: hands-on activities and teacher-centred activities, as illustrated in Figure 4.

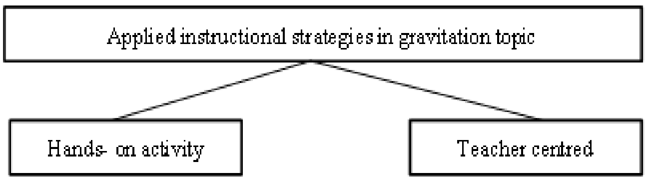

Figure 4: Applied instructional strategies in gravitation topic

According to one informant, the practical activities conducted primarily involve demonstrating scientific theories through hands-on tasks. Students engage in these activities either independently or in groups by following the provided instructions. When a theory is supported

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through such practical engagement, students not only utilise scientific skills but also enhance their performance in science learning (Idris, Talib & Razali 2022).

> *"... So, i will tell them to make a painting of their own, there is a step by step he is step by step to measure... So, from there, from the hands-on activity, they can prove that the two areas are the same..."(T3)*

All informants reported that teacher-centred instructional approaches, such as lecture-based teaching, rely heavily on the textbook. This reliance stems from the textbook's comprehensive presentation of content, which is visually appealing due to its use of graphics and vibrant colours. However, a study found that when students rely exclusively on textbooks, they may experience significant cognitive load due to the complexity and challenging nature of the subject matter, which can hinder their understanding of the content (Ningsih, 2018).

> *"... I also use simple modules as teaching aids because if we really follow the textbook, it really seems too complicated for students to understand..." (T4)*

Two informants reported that they proactively acquired physics topical modules either from commercial sources or through sharing with other teachers. These modules were then distributed to students as practice materials to enhance their conceptual understanding of the topic and to improve their ability to apply the correct formulas in solving calculation-based questions.

Theme 4: Desired enhancement for instructional strategies in Gravitation topic

The fourth theme focuses on the desired enhancements for instructional strategies. The resulting codes identified under this theme are student-centred strategies, utilisation of information and communication technology (ICT), and the use of instructional modules, as illustrated in Figure 5 below.

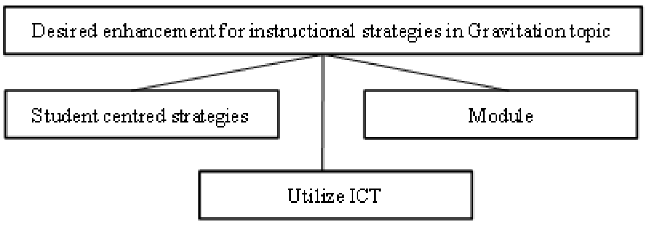

Figure 5: Desired enhancement for instructional strategies in Gravitation topic

Given that this topic is largely rooted in phenomenology, it is important to acknowledge that certain phenomena, such as the gravitational pull between the earth and the moon, cannot be observed directly. Therefore, all informants agreed that this topic should be taught using student-centred strategies, including role play, hands-on activities, gallery walks, and inquiry-based approaches such as project-based and problem-solving activities.

> *"...so, the approach to demonstrate to students that the area near the Sun is the same as the area far from the Sun is through an inquiry-based approach…(T2)*
>
> *Teachers can also conduct project-based activities, such as designing a satellite or creating a learning material that distinguishes between Kepler's laws. Such activities can enhance students' thinking skills…(T4)*

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All informants agreed that this topic needs to be taught using video presentations to illustrate phenomena that are not visible to the naked eye. They also suggested that utilising technology and accessing information through online sources such as Google, as well as social media platforms like YouTube, Instagram, and Facebook, can assist both teachers and students in effectively searching for and understanding information related to this topic (Lämsä et al., 2018).

> *"... Because there is no experiment, so it has to be inserted with a teaching video so that the children can see that there are graphics and videos for them to understand..."(T1)*

> *"... As an induction set, I will first show you an interesting video on this topic..."(T3)*

Discussion

The study identifies four key themes regarding the needs on developing IBL module for Gravitation topic in the KSSM physics syllabus, providing both insights and challenges:

1) **Significance of Studying Gravitation**: The Gravitation topic plays a vital role in expanding students' understanding of physics concepts and their real-world applications. Building upon students' prior knowledge from lower secondary science education enables them to form meaningful connections with the topic, thereby stimulating interest in STEM-related careers such as astronomy and aeronautical engineering. Furthermore, the inclusion of complex formulas within the topic encourages the development of higher-order thinking skills, although it also necessitates a deeper conceptual understanding and cognitive engagement.
2) **Issues in Teaching and Learning Gravitation**: Several challenges were identified in the teaching and learning of the Gravitation topic. The abstract nature of the content makes it difficult for students to visualise the phenomena involved. A recurring issue is the prevalence of misconceptions stemming from the complex and numerous formulas introduced, which often leads to confusion in selecting and applying the correct formula in problem-solving scenarios. Additionally, teachers reported insufficient readiness due to limited training and a lack of appropriate teaching resources. This underlines the urgent need for targeted professional development and the integration of specialised teaching modules to support instructional delivery.
3) **Applied Instructional Strategies**: The study revealed that teachers employ a combination of hands-on and teacher-centred instructional strategies. Hands-on activities are particularly effective in helping students physically engage with theoretical concepts, thereby enhancing comprehension. However, there remains a heavy reliance on traditional lecture-based teaching and textbook usage. While textbooks offer structured content, they can contribute to cognitive overload due to the complexity of the subject matter. As a result, the findings suggest a pedagogical shift towards more interactive, visual, and student-engaged teaching methods to support deeper learning and reduce student anxiety.
4) **Desired Enhancements in Instructional Strategies**: Informants advocated for the incorporation of student-centred instructional approaches, such as role-playing, inquiry-based learning, and problem-solving activities, to make abstract concepts more accessible and engaging. They also highlighted the importance of leveraging information and communication technology (ICT), particularly video-based content, to demonstrate phenomena that are not directly observable, such as gravitational

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interactions. The integration of online resources, including platforms such as YouTube, was seen as a valuable supplement to traditional instruction, enhancing both students' understanding and engagement with the topic.

Conclusion

In conclusion, while the topic of Gravitation is widely acknowledged as essential for students' conceptual development and for cultivating interest in STEM related careers, its teaching remains challenging. The abstract nature of the content, over-reliance on complex formulas, and limited teacher preparedness contribute to difficulties in effective instruction. Enhancing teaching practices through the integration of technology, student-centred activities, and improved teacher training is critical to improving students' learning outcomes. The findings of this study offer valuable insights that inform the development of an inquiry-based learning (IBL) instructional module aligned with the current educational context.

The needs analysis conducted in this study has identified the importance, expectations, challenges, and instructional requirements associated with the Gravitation topic. Despite variations in the educational backgrounds of the informants, they shared similar concerns and instructional needs. The feedback obtained regarding teaching strategies and instructional practices underscores the necessity of developing teaching materials that are aligned with the content and learning standards of the national physics curriculum. All informants unanimously agreed on the need for a specialised IBL module to improve the teaching and learning of this topic.

As this needs analysis focused solely on the perceptions of secondary school Physics teachers, several recommendations are proposed for future research to provide a more comprehensive perspective. Researchers are encouraged to conduct interviews with students to gather insights into the difficulties they encounter when learning the Gravitation topic and to understand their preferred instructional methods. This would help ensure the module is tailored to students' learning needs. Additionally, the involvement of pedagogical experts is vital in enhancing the quality and effectiveness of the proposed IBL module. Interviews with education specialists can provide critical insights into learning theories, effective instructional strategies, and the cognitive processes involved in knowledge acquisition. By incorporating input from teachers, students, and pedagogical experts, the development of the IBL Gravitation module can be more effectively tailored to students' cognitive levels, making it more engaging, interactive, and impactful in enhancing their interest and comprehension of the subject.

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