Needs Analysis for Developing an Augmented Reality-Based History Learning Module to Enhance Historical Thinking Skills among Primary School Students

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***Abstract*—History is often perceived as a difficult subject for primary school students, particularly when dealing with abstract topics such as the Prehistoric Era and the Ice Age. This study examines the need for an Augmented Reality (AR)-based history learning module for Year 4 students in Malaysian primary schools. Using a qualitative design, data were gathered through semi-structured interviews with five history teachers and two students. The findings indicate a heavy reliance on textbooks, limited use of interactive tools, and challenges in delivering complex content effectively. Students described lessons as monotonous and demonstrated underdeveloped historical thinking skills due to passive learning environments. However, both teachers and students expressed strong interest in AR technology for its potential to enhance visualization, engagement, and understanding. In order to promote more engaging and meaningful history learning experiences at the primary level, the study highlights the necessity of an AR module that is aligned with the curriculum.**

***Index Terms*—Augmented Reality, History Learning Module, History, Primary School Student, Historical Thinking Skill**

I. Introduction

Technology is playing an increasingly important role in history education, with Augmented Reality (AR) emerging as a powerful tool for innovation. It offers immersive and interactive learning experiences that help students visualize and understand complex or abstract historical concepts more effectively than traditional methods [1]. However, despite its potential, many classrooms continue to rely heavily on memorization and teacher-centered instruction, which can reduce student engagement and make it difficult for learners to relate historical content to their everyday lives [2].

In Malaysia, the Malaysia Education Blueprint 2013–2025 outlines a strategic national initiative to integrate technology into education, including in history education [3]. However, history remains one of the least engaging subjects among primary school learners. Research highlights that students frequently struggle to relate to historical topics due to their abstract nature and the lack of interactive tools that can bring these concepts to life [4]. The Year 4 curriculum, which includes content on the Ice Age and the Prehistoric Era, exemplifies this challenge, as it demands a high level of imaginative thinking and historical understanding.

Augmented Reality presents a potential solution by creating visually rich and contextually immersive environments that enhance learning engagement. Empirical studies have demonstrated that AR can significantly improve student motivation, increase content retention, and foster active participation in history lessons [5],[6]. Studies have shown that students taught using Augmented Reality (AR) demonstrate increased enthusiasm and a deeper understanding of historical content [7].

Despite these promising outcomes, the implementation of AR in primary-level history instruction remains limited. Educators report challenges in accessing appropriate AR tools and in developing content that aligns with national curriculum requirements [8]. Concurrently, students express a strong preference for interactive and visually engaging learning environments, indicating a clear disconnect between educational policy objectives and actual classroom practices. This highlights the need to develop a curriculum-aligned AR-based history module specifically tailored to the learning needs of Year 4 students.

A. Research Objective

To determine the development requirements for an Augmented Reality History Learning Module for Year Four history topics in Malaysian primary schools.

B. Research Questions

1. What challenges are encountered in the teaching and learning of Year Four History, based on the perspectives of subject matter experts and students?
2. How do experts perceive the development of an Augmented Reality History Learning Module for Year Four students?

II. Literature Review

A. The Importance of History Education

History education has a significant impact on pupils' knowledge of national identity, cultural legacy, and societal progress. It goes beyond simply transmitting previous events by developing critical thinking abilities, ethical ideals, and a feeling of civic responsibility [9]. Malaysia's primary school history curriculum is deliberately designed to inspire patriotism, national solidarity, and a deeper respect for the country's rich and diverse heritage [10]. History does more than just describe historical events; it also helps students grasp present societal processes, respect cultural variety, and develop

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well-informed and balanced worldviews. According to recent studies, history education also helps kids' socio-emotional development by improving their ability to empathize with other points of view and apply historical lessons to current concerns [2]. Incorporating new teaching approaches, such as technology-enhanced learning settings, helps to advance these educational aims. According to research, immersive technology in history classes can greatly increase student engagement, deepen knowledge, and foster reflective thinking, so increasing the overall learning experience [4].

B. Enhancing Generated Content

Although history offers significant educational value, many students still perceive it as dull and unengaging. This view is mainly due to its traditional focus on rote memorization and passive learning methods. The problem is especially noticeable among primary school students, who tend to respond better to interactive and visually rich learning experiences that help them grasp abstract historical concepts. The continued reliance on lecture-based teaching, which often limits student participation and centers on teacher-led instruction, makes it even harder to spark students' interest or encourage a deeper understanding of how historical events connect to the present [4]. Adding to the challenge is the limited use of modern teaching tools and technology in history classrooms. Many teachers lack the necessary training and support to integrate digital resources and interactive strategies into their lessons effectively. As a result, history education often depends heavily on textbooks and static materials that do not match the learning preferences of today's digitally inclined students. This lack of engaging resources and minimal use of interactive technology are key reasons why students tend to disengage and see history as a boring subject [11].

C. Historical Thinking Skills

Historical thinking abilities are vital for good history instruction because they allow students to interact critically with the past by accessing data, comprehending cause-and-effect linkages, and considering other perspectives. Rather than focusing solely on the memorizing of historical facts, these skills nurture students' ability to construct reasoned arguments and draw informed conclusions [12]. Historical Thinking Skills (HTS) shift the focus from rote memorization of historical facts and dates toward the development of higher-order thinking skills, including critical analysis and reflective inquiry [13],[14]. In the context of primary education, fostering historical thinking is particularly important for developing students' analytical abilities and deepening their understanding of historical events. Introducing HTS at the primary level is essential because early exposure encourages students to build empathy, civic awareness, and the ability to reason historically. Studies have shown that young learners can engage in historical reasoning when provided with appropriate tools and guidance [15],[25].

However, the development of these skills in Malaysian primary schools remains limited. Traditional teaching approaches, often centered on rote memorization and passive learning, continue to dominate classrooms and hinder the development of students' critical and analytical capacities [12]. Conventional textbook-based approaches often do not support this process. Instead, they promote surface-level learning, where historical knowledge is presented as fixed rather than something to be questioned, explored, and interpreted. This gap has led to growing interest in using interactive technologies such as Augmented Reality (AR) to create immersive, inquiry-driven learning experiences that align with the goals of HTS [1]. This conventional pedagogy limits student engagement and hinders their ability to interpret and evaluate historical events critically. To address these challenges, educators must adopt teaching strategies that emphasize the cultivation of historical thinking. Inquiry-based learning, for instance, encourages students to investigate historical questions, examine primary sources, and construct evidence-based narratives. This approach promotes active and meaningful engagement with historical content [16]. The integration of technology-enhanced tools such as learning analytics and student response systems can further support this process by offering immediate feedback and facilitating the development of both substantive and procedural historical knowledge [17]. It is also crucial to provide professional development programs that enhance teachers' understanding and application of historical thinking pedagogies. These programs can equip educators with the skills and knowledge needed to create student-centered learning experiences that foster critical engagement with history [18].

D. History Education and Augmented Reality (AR)Technology

The integration of Augmented Reality (AR) in educational settings has gained increasing attention, particularly in subjects such as History, where visual and interactive engagement can significantly enhance learning outcomes. AR allows students to explore three-dimensional historical environments, artifacts, and simulations, making abstract or distant historical events more tangible and meaningful to learners [19].

Through immersive experiences, AR enables students to visualize the past, fostering deeper cognitive engagement and a more nuanced understanding of historical content. In primary education, the implementation of AR has been shown to stimulate curiosity, boost student motivation, and improve the retention of historical knowledge. The use of AR technologies promotes active learning by enabling students to interact with historical sources in rich, contextually relevant environments. This approach supports the development of historical thinking skills by encouraging learners to interpret evidence, examine cause-and-effect relationships, and consider multiple perspectives on historical events [20].

Furthermore, AR contributes to the construction of historical consciousness by helping students contextualize and personalize their understanding of history. It transforms learning from a passive process into an active inquiry, where students are engaged in interpreting sources and constructing historical meaning [17].

Despite these pedagogical advantages and global trends favoring AR integration, its use in Malaysian classrooms remains limited. Significant challenges include inadequate digital infrastructure, restricted access to AR-compatible devices, and a lack of teacher training on the effective application of AR tools in history education. Many teachers report feeling unprepared to integrate AR into their teaching due to a lack of sufficient professional development opportunities and limited instructional support [21]. Consequently, the transformative potential of AR in enhancing history education is yet to be fully realized within the Malaysian primary school context.

III. METHODOLOGY

This study employed a qualitative research design, focusing on the needs analysis phase, which represents the initial stage of the Design and Development Research (DDR) model as outlined by Richey and Klein [22]. The primary objective of this phase was to gain a comprehensive understanding of the actual needs and expectations related to an Augmented Reality (AR)-based History Learning Module designed for Year 4 primary school students in Malaysia. The selection of Year 4 students as the target group for developing the AR-based History learning module is based on curricular and developmental considerations. In the Malaysian primary school system, Year 4 is the first level at which History is formally introduced as a standalone subject [23]. As such, it is critical in shaping students' initial understanding of and attitudes toward the subject. The Year 4 syllabus includes abstract and unfamiliar topics, such as the Prehistoric Era and the Ice Age, requiring more imaginative thinking and visualization. These topics pose unique challenges, especially for students encountering historical content for the first time.

In contrast, the History curriculum in Year 5 and Year 6 focuses on more structured and narrative-based topics, such as early civilizations and national historical events. These topics are generally easier to relate to and understand, often including recognizable figures, events, and timelines [23]. Moreover, students in upper primary levels are more accustomed to History lessons and may already have formed learning habits and attitudes, whether positive or negative, toward the subject. Students' engagement in History declines when learning routines become overly familiar and are not supported by innovation or interactivity [11]. As students grow older, their perceptions of History become more fixed, and earlier classroom experiences and the pedagogical approaches used to shape their motivation and interest [17]. It is also important to note that History is a core secondary school subject and is compulsory for passing the Malaysian Certificate of Education (SPM) examination [24]. Therefore, building a strong foundational interest and understanding at the primary level is essential. A lack of early engagement may lead to difficulties in coping with the subject later, especially as students face higher academic demands and examination pressure. Early exposure to meaningful historical learning experiences can influence students' long-term academic attitudes and civic understanding [25].

From a developmental standpoint, most Year 4 students, typically aged around 10, are in the concrete operational stage as defined by Piaget. Students begin thinking logically at this stage but benefit significantly from concrete, visual, and interactive learning experiences. For this reason, they are particularly well-suited to benefit from educational tools such as Augmented Reality (AR), which can transform difficult historical content into tangible and engaging learning experiences [19].

Research also suggests that introducing interactive and visual tools at the early stages of learning a new subject substantially impacts students' long-term interest and motivation. Younger students introduced to History through AR applications demonstrated greater enthusiasm and improved understanding than older students who were later introduced to similar tools [20]. Furthermore, students tend to disengage early when traditional, text-heavy methods dominate their first encounters with new subjects [11].Therefore, targeting Year 4 students allows for early intervention. Early engagement offers a valuable opportunity to cultivate more positive learning experiences and attitudes toward History. The approach is intended to improve comprehension of abstract content and lay the foundation for sustained interest and the development of historical thinking skills in later years.

To ensure the module's relevance and effectiveness, feedback was obtained from the end users, specifically History teachers and students. A needs analysis was carried out to identify existing challenges and learning gaps in primary History education. This process was guided by the Discrepancy Model proposed by McKillip (1987), a widely recognized framework in educational research used to identify differences between ideal instructional practices and the realities of classroom implementation [26]. This model enabled the researcher to systematically pinpoint discrepancies that required intervention to improve teaching and learning outcomes.

This study employed purposive sampling to select participants who could provide rich, relevant, and experience-based insights into the teaching and learning of History at the primary level. The researchers selected five experienced History teachers who actively taught Year 4 and were directly involved in implementing the national History curriculum. Each teacher had at least five years of teaching experience and was familiar with the challenges of delivering abstract content, such as the Prehistoric Era and Ice Age, to young learners. Their expertise was instrumental in helping the researchers understand current teaching practices and assess the potential of Augmented Reality (AR) as a pedagogical tool. To ensure relevance and depth, the teachers were selected based on their extensive experience in teaching History at the relevant educational level, ensuring the provision of valuable pedagogical insights. In addition to the teachers, two Year 4 students were selected to represent the learner perspective. Their teachers recommended these students based on their ability to express their thoughts clearly and their active participation during History lessons. Including students in the data collection allowed the study to capture authentic feedback on how History is currently taught and how young learners experience it. The student participants were deliberately chosen to reflect a range of academic abilities and varying levels of interest in History. One student was identified as a high achiever, while the other experienced more challenges in schoolwork. Additionally, one student expressed a strong interest in History, whereas the other did not enjoy the subject. Both students were enrolled in Year 4, aligning directly with the study's intended target population. This selection process reflects standard qualitative research practices, where smaller, focused samples are used to gain deep, context-rich insights from those most closely connected to the phenomenon being studied [27]. By incorporating perspectives from teachers and students, the study was able to build a more complete picture of the classroom environment. This triangulation of views also enhances the credibility and trustworthiness of the findings, essential qualities in qualitative research [28],[29]. Table I presents a summary of the demographic information of the informants.

TABLE I
DEMOGRAPHIC INFORMATION OF INFORMANTS

Informant Code	Category	Age	Sex	Option	Teaching Experience (Years)	The State of teaching/ schooling

GS1	Teacher	45	F	Social Studies	11	Terengganu
GS2	Teacher	43	F	Social Studies	11	Negeri Sembilan
GS3	Teacher	47	F	Social Studies	11	Selangor
GS4	Teacher	44	F	Social Studies	11	Johor Bahru
GS5	Teacher	40	F	Social Studies	11	Melaka
M1	Student	10	M	-	-	Negeri Sembilan
M2	Student	10	M	-	-	Negeri Sembilan

A. Data Collection Process

The study employed semi-structured interviews to collect rich and in-depth qualitative data. This approach followed the recommendations of Bernard (2000), who emphasized the importance of careful planning, building rapport, and creating a safe and supportive environment for participants. Purposive sampling was used to ensure that the selected participants were directly relevant to the study's focus on Year 4 History education [30].

Before the data collection process began, an official invitation letter was sent to all prospective participants. The letter provided detailed information about the study's purpose, procedures, and ethical considerations. Only those who provided formal consent were included in the interview sessions. This procedure ensured that participation was informed and aligned with the ethical standards of research.

Interviews with teachers explored their pedagogical experiences, the challenges they faced in teaching History, and their views on the integration of Augmented Reality (AR) technology. Students were asked to share their experiences in learning History, the difficulties they encountered, and their attitudes toward the use of technology in the classroom. The semi-structured interview format allowed for open-ended responses, giving participants the flexibility to elaborate on their thoughts and experiences.

To ensure the validity of the interview protocol, the questions were reviewed and refined by experts in qualitative research and specialists in History education prior to data collection. This review process helped to confirm the content validity and relevance of the interview questions. All interviews were conducted in familiar school settings to encourage comfort and openness among participants. For student interviews, parental consent and participant assent were obtained in accordance with ethical research guidelines.

All interview sessions were audio-recorded with the participant's permission and supplemented by field notes to capture nonverbal cues. After data collection, the recordings were transcribed verbatim, and the transcripts were systematically organized to prepare for analysis.

B. Data Analysis and Trustworthiness

Our Thematic analysis, as outlined by Braun and Clarke (2006), was employed to guide the systematic coding and interpretation of the interview data. The researcher identified recurring patterns within the responses and organized them into coherent themes that aligned with the study's research questions [31].

To ensure the trustworthiness of the analysis, the thematic coding and interpretations were independently reviewed by experts in qualitative research. This validation process enhanced the rigor of the findings. Inter-rater reliability was assessed using Fleiss' Kappa statistic, which demonstrated substantial agreement, with a value greater than 0.75. This result confirmed the consistency and dependability of the data analysis and strengthened the credibility, confirmability, and reliability of the interpretations [32], [33].

The insights obtained through this rigorous analytical process served as the foundational basis for designing an Augmented Reality (AR) -supported History Learning Module. The module was developed to effectively address the pedagogical needs and learning preferences of Year 4 students.

IV. Result

Through a systematic thematic analysis, six distinct themes were identified, reflecting the experiences and perspectives of the study participants. Four of these themes corresponded to the first research question, while the remaining two addressed the second research question. The six themes that emerged from the data analysis include challenges related to teaching aids in History education, pedagogical challenges in History instruction, student attitudinal challenges in learning History, difficulty in mastering historical thinking skills (HTS), the need for structured learning modules in History education, and the use of Augmented Reality (AR) to enhance History learning. Figure 1 presents an illustration of the main themes and their associated subthemes, providing a clear and organized overview of the key findings uncovered in this study.

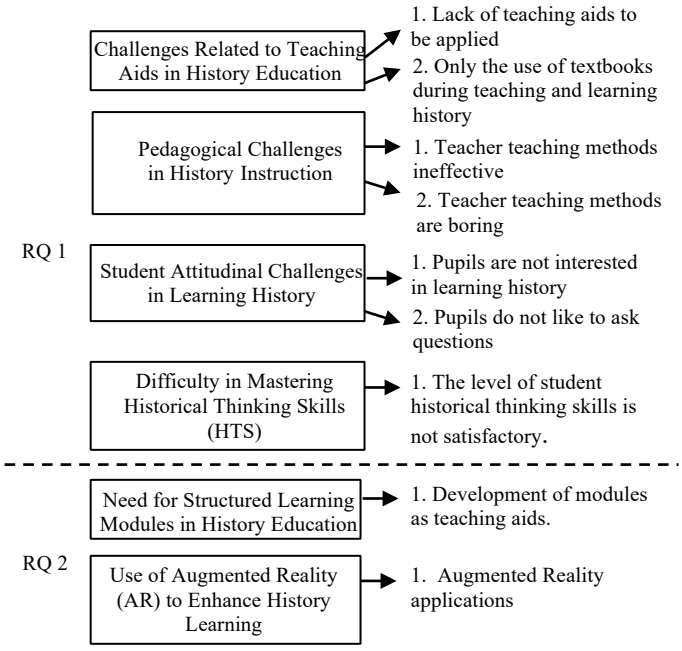

Fig. 1. Main themes and sub-themes of the study

A. Theme 1: Challenges Related to Teaching Aids in History Education

The inadequacy of effective teaching aids in History classrooms

presents a significant obstacle to student engagement and comprehension. Current materials frequently fail to captivate students' attention or stimulate their interest, limiting their ability to visualize and internalize historical narratives [16],[34].

1) *Limited Availability of Teaching Aids*

Educators report a scarcity of relevant and stimulating teaching aids. The lack of engaging materials hinders both teaching efficacy and students' conceptual understanding.

"We are lacking teaching aids for use in the classroom." (GS1)
"Teachers also lack teaching aids to apply in teaching and learning." (GS5)
"Sometimes we lack teaching aids when we want to teach." (GS3)
"...lacking attractive materials that help to engage students." (GS1)

2) *Overreliance on Textbooks*

History instruction is often overly dependent on textbooks, with limited incorporation of supplementary or interactive resources. This approach restricts pedagogical diversity and reduces student interest and motivation.

"Teachers are based solely on the use of textbooks." (GS5)
"Everything we use is based on the textbook." (GS4)
"Textbook. Helps a little." (M2)
"The teacher reads the textbook aloud, and students, listen, then answer questions." (M1)

B. Theme 2: Pedagogical Challenges in History Instruction.

Traditional, teacher-centered approaches continue to dominate History classrooms, leading to decreased student engagement and poor comprehension of historical content [35].

1) *Ineffective Teaching Methods*

Interviewees noted that current methods, which are often limited to lectures and rote memorization, are insufficient for stimulating critical thinking or maintaining sustained attention.

"The method used is not effective. It fails to help students understand the content clearly." (GS1)
"Teaching methods are often just 'chalk and talk'." (GS1, GS5)

2) *Tedious and Repetitive Learning Activities*

Students express fatigue and disengagement due to monotonous instructional activities, particularly when forced to transcribe content without interaction passively.

"The "I feel tired of always having to write in the notebook." (M2)
"Activities were described as outdated and unengaging." (M1)

C. Theme 3: Student Attitudinal Challenges in Learning

History Student disinterest and passivity in History classes are compounded by ineffective pedagogy and a lack of emotional engagement with the subject [36].

1) *Lack of Interest and Patriotism*

Many students show minimal enthusiasm for learning History, often perceiving the subject as irrelevant or unengaging.

"Students simply aren't interested in the subject." (GS5)
"They lack patriotism and interest in historical facts." (GS5)
"Yes, it is possible, as some teachers vary their instructional methods. At times, they rely on textbooks, while on other occasions, they incorporate interactive activities, which can positively influence student engagement." (M1)
"Students are still in the process of transitioning from lower to upper primary levels. As a result, it takes time for them to develop a deeper understanding of historical concepts."(GS2)

2) *Reluctance to Ask Questions*

A pervasive lack of curiosity leads to passive learning, where students hesitate to seek clarification even when they are confused.

"Students stay quiet when they don't understand." (GS5)
"He's not engaged, and so what he learns doesn't impact him." (GS4)

D. Theme 4: Difficulty in Mastering Historical Thinking Skills (HTS)

Historical Thinking Skills (HTS) are foundational for fostering analytical and reflective engagement with historical content. However, many students struggle to reach expected cognitive levels [34].

1) Students have yet to demonstrate strong historical thinking skills

Interview data reveal that a majority of students operate at a basic level, with only a minority demonstrating moderate to advanced HTS.

"Most of them are still operating at a low level of HTS." (GS4)
"Students at this stage are still developing intellectual maturity." (GS1)
"Some students just observe without engaging." (GS3)

E. Theme 5: Need for Structured Learning Modules in History Education.

Experts advocate for the development of structured, thematic modules to facilitate History instruction, particularly for abstract topics such as the Ice Age or Prehistoric era [37].

1) *Limited Availability of Teaching Aids*

A thematic module tailored to History content would serve as an essential teaching aid, supporting educators in delivering complex topics more effectively.

"A module focusing on the Ice Age and Prehistoric Age are needed." (GS5)
"Currently, no module clearly explains these two topics." (GS2)
"A module would be extremely helpful." (GS3)

F. Theme 6: Use of Augmented Reality (AR) to Enhance History Learning.

Emerging technologies, such as Augmented Reality (AR), offer transformative potential for History education by increasing student immersion and cognitive engagement [38].

"Virtual objects feel lifelike and make learning engaging." (GS5)
"AR brings learning to life and helps students understand better." (GS4)
"AR helps teachers achieve teaching goals and keeps students focused." (GS1)
"AR feels fun, like playing while learning." (M2)

This study highlights several critical challenges in History education, including the limited availability of effective teaching aids, reliance on outdated pedagogical approaches, low

student engagement, and difficulties in developing Historical Thinking Skills (HTS). The predominant use of textbooks restricts interactive and meaningful learning experiences. To address these challenges, the findings emphasize the importance of developing structured, thematic learning modules in conjunction with the integration of Augmented Reality (AR) technologies. These innovations have the potential to improve students' understanding, increase their motivation, and enhance their engagement with historical content. In turn, this approach can promote a deeper understanding of history and foster the development of critical thinking skills.

V. Discussion

The results of the needs analysis reveal a clear, shared concern among Year 4 History instructors and students: present instructional techniques for teaching abstract concepts like the Ice Age and the Prehistoric Era are ineffective. These courses, which involve innovative thinking and intellectual knowledge, are frequently given in ways that rely too heavily on textbook-based learning. Teachers reported having little access to supportive instructional materials, relying almost completely on textbooks. Pupils confirmed that their history education is mostly book-based, resulting in dull and uninspired classroom sessions.

An overreliance on textbooks presents a big obstacle in teaching History, a subject that thrives on narration, visualization, and active learner participation. When learning is based solely on textbooks, pupils become passive consumers of information, unable to develop critical historical perspectives [34],[12]. Textbooks rarely promote higher-order thinking or the development of the interpretive abilities required to examine historical events [39],[4]. As a result, both teachers and students believe that history classes are unmemorable and ineffective. Interview findings reveal that a heavy reliance on textbooks in History classrooms can negatively affect students' interest, engagement, and participation. Teachers shared that their teaching methods were limited to textbook reading and written exercises. For example, one teacher (GS4) explained, "Everything we use is based on the textbook," while another (GS5) added, "Teachers are based solely on the use of textbooks." This approach often leaves little room for creativity, discussion, or interactive learning.

Students also expressed similar frustrations. One student (M1) shared, "The teacher reads the textbook aloud, and students listen, then answer questions," illustrating a passive learning environment. Another (M2) said, "I feel tired of always having to write in the notebook," reflecting how repetitive and non-interactive tasks can cause disinterest. These responses suggest that textbook-based instruction can lack stimulation and limit students' more profound understanding of historical content.

This issue is supported by earlier research, which shows that History lessons dominated by memorization and textbook reading tend to be perceived as boring and irrelevant [11],[34]. Traditional methods restrict students' ability to explore multiple perspectives and critically engage with historical events [4]. Students may struggle to connect emotionally or intellectually with historical events without meaningful interaction.

In addition, studies highlight that younger learners benefit more from engaging, visual, and interactive teaching methods. These approaches have been shown to help students grasp abstract historical concepts more effectively [1],[6]. Without such support, disengagement can begin early concerns since History becomes a compulsory pass subject in Malaysia's SPM examination [25].

This study recommends adopting more interactive, student-centered teaching strategies to overcome these challenges. Teachers can incorporate multimedia and AR tools to visualize historical events, especially distant or abstract ones. Inquiry-based learning, storytelling, role-playing, and group discussion can make lessons more engaging. Additionally, practical activities like creating mind maps, building timelines, or analyzing artefacts can enhance participation and deepen understanding.

This recommendation is further supported by research showing that the integration of augmented reality (AR) in the classroom can enhance students' motivation, concentration, and retention of historical content [1],[19]. Moving beyond textbook-dependent instruction toward more active and immersive methods is essential to nurturing historical thinking and long-term interest in the subject.

Compounding the problem is the continued use of traditional instructional methods, particularly the "chalk and talk" style, in which the teacher speaks while the students passively listen. While simple to execute, this method provides little chances for student participation and innovation, making History classes uninteresting and removed from students' lives. Pupils frequently memorize dates and statistics without developing a deeper knowledge of the storylines and linkages that underpin historical events. According to research, this teacher-centered strategy reduces students' ability to generate meaning and engage in historical inquiry [11].

Moreover, students frequently describe History as a boring subject, even when teachers attempt to make lessons enjoyable. Many view it as difficult, irrelevant, or unrelatable to their own lives. A lack of emotional and cognitive engagement contributes to students' reluctance to ask questions or participate actively in lessons. Motivation declines when History is reduced to memorizing disconnected facts, with little effort to contextualize the content or connect it to students' lived experiences [6],[11]. Student engagement improves significantly when History is presented in ways that emphasize personal relevance, inquiry, and narrative exploration [40].

Another major concern raised in this study is the underdevelopment of Historical Thinking Skills (HTS) among Year 4 pupils. Teachers observed that many students struggle with critical tasks such as identifying causes and consequences, analyzing change over time, or making evidence-based inferences. This challenge is not unexpected, considering the cognitive development stage of upper primary students. This study highlights that current textbook-based methods in History teaching are insufficient in fostering Historical Thinking Skills (HTS). Students are often passive recipients of information, with limited opportunities to explore cause-and-effect relationships, compare perspectives, or interpret the significance of historical events. These findings are consistent with earlier research, which noted that traditional methods limit students' ability to think historically and engage critically with the past [11],[34]. Research suggests that younger learners require scaffolding and structured opportunities to develop these higher-order thinking skills [12],[18],[16]. Unfortunately, current teaching resources, which primarily consist of narrative-

based texts, offer little support for this development. Without interactive or visual elements, students are unlikely to engage meaningfully with the content or connect historical facts within broader frameworks [19],[20].

This study's AR-based History learning module is designed to address these limitations. It provides immersive learning experiences that encourage students to explore historical content actively. For example, students can virtually visit a prehistoric site, interact with 3D reconstructions of artefacts, or engage in simulations that present alternative outcomes. Features like interactive timelines and location-based AR activities help students develop chronological understanding and contextual thinking. By engaging directly with content in a multisensory way, students are more likely to retain information and develop deeper insights. These AR-enhanced activities align with established frameworks for HTS that emphasize evidence-based reasoning, empathetic understanding, and critical reflection [14].

AR-supported learning environments significantly improve students' motivation and comprehension [1],[19]. When History is presented as an engaging, exploratory process rather than a list of facts, students are more likely to develop a lasting interest in the subject. Therefore, integrating AR into History instruction at the primary level offers a promising approach to fostering HTS and preparing students for more complex historical thinking in the years ahead.

In light of these challenges, the development of an Augmented Reality (AR)-based learning module is both timely and necessary. Feedback from both teachers and students indicates a strong openness—and even enthusiasm—toward the integration of technology in History classrooms. Students expressed a genuine interest in interactive and visually enriched learning environments. For abstract topics such as the Ice Age and the Prehistoric Era, Augmented Reality (AR) can significantly enhance understanding by enabling students to explore three-dimensional models of ancient artifacts, glacial formations, and prehistoric tools. These immersive learning experiences have been shown to improve student motivation, deepen conceptual understanding, and support long-term knowledge retention [19], [20], [21].

Although this study involved a relatively small number of participants, specifically five History teachers and two Year 4 students, the sample size is considered appropriate for qualitative research, particularly within the context of a needs analysis. The objective of this phase was not to generalize findings but to gain in-depth insights into the challenges and expectations surrounding History teaching and learning at the primary level. Participants were purposively selected based on their direct relevance and experience, ensuring that the data collected were rich, specific, and meaningful. During the analysis, recurring themes and patterns emerged consistently across interviews, which indicates that data saturation had been achieved. This suggests that additional participants would have been unlikely to provide significantly new information. As highlighted by Creswell (2016) and Braun and Clarke (2006), qualitative research prioritizes the depth and richness of data over sample size [28],[31]. Therefore, the sample used in this study was adequate to fulfill the research objectives and served as a strong foundation for informing the design of the proposed History learning module.

Ultimately, the study highlights a significant gap between current History teaching practices and the pedagogical needs of both teachers and students. Augmented Reality offers a powerful means of bridging this gap. By transforming passive, textbook-based instruction into an interactive, engaging, and student-centered learning experience, AR supports the core objectives of 21st-century education. These include fostering critical thinking, encouraging inquiry-based learning, and nurturing a lifelong interest in historical exploration [21].

VI. Conclusion

This This study highlights the pressing need to enhance the quality of History instruction in Malaysian primary schools, particularly when addressing complex topics like the Prehistoric Era and the Ice Age. The findings reveal that current teaching practices rely heavily on textbooks and passive instructional methods. These approaches are insufficient for engaging students or for supporting the development of historical thinking skills.

Teachers report considerable limitations in accessing appropriate teaching aids, while students express low levels of interest and motivation in learning History. Despite these challenges, both teachers and students demonstrate a strong willingness to adopt technological innovations. In particular, there is considerable interest in the use of Augmented Reality (AR) as a means to enhance the learning experience in history.

The findings of this study suggest that developing a structured, curriculum-aligned Augmented Reality (AR)-based History learning module is essential. Such a module holds the potential to transform traditional classrooms into interactive and immersive learning environments. It can help students visualize abstract historical content, engage more deeply with historical narratives, and develop critical thinking and inquiry-based skills. Moreover, the integration of AR in History education is consistent with national educational goals that emphasize digital literacy and the acquisition of 21st-century learning competencies.

Students' strong interest in Augmented Reality (AR) technology positively influenced their motivation to learn History. During interviews, students shared that they enjoyed AR-based lessons and described them as similar to "playing while learning." This engaging and enjoyable experience made them more enthusiastic about participating in class activities. It also helped reduce boredom and increased their willingness to focus and interact with the content.

Teachers also observed that students were more attentive and showed greater curiosity when AR was used in the classroom. Some noted that students who were usually passive became more active, asked more questions, and were eager to explore historical topics independently. These changes in student behaviour suggest that AR improves understanding and creates a more motivating and dynamic learning environment.

By making abstract historical content more visual, interactive, and relatable, AR helps students connect more deeply with what they are learning. This connection supports intrinsic motivation, essential for long-term engagement and meaningful learning. Therefore, integrating AR into History lessons can significantly increase student interest and enhance overall educational outcomes.

However, this study is subject to several limitations. The research involved a small, purposively selected sample comprising five teachers and two students from a limited geographic area. As a

result, the findings may not fully reflect the diversity of educational contexts across Malaysia. Additionally, the study focused solely on the needs analysis phase and did not include the subsequent stages of design, development, or implementation of the proposed AR module. Therefore, while the results provide valuable insights, they should be viewed as preliminary and exploratory.

Future research should involve a broader and more diverse sample of participants from various regions and educational settings. The subsequent phases should include the design and development of the AR-based learning module, followed by pilot testing and evaluation within authentic classroom environments. Longitudinal studies could also be conducted to assess the long-term impact of AR integration on student learning outcomes, the development of historical thinking skills, and shifts in teaching practices. Furthermore, future research should investigate the professional development needs of teachers to ensure they are adequately prepared and supported to implement AR technology in their classrooms effectively.

In conclusion, this study offers foundational insights into the pedagogical challenges of teaching History at the primary school level and highlights AR as a promising solution. By addressing the gaps identified through this needs analysis, the development of an AR-based learning module has the potential to significantly enhance the teaching and learning of History, making it more engaging, relevant, and meaningful for young learners.

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