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Interactive Learning Redefined: H5P's Role in Optimising Self-Instructional Materials for Open and Distance Learning

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Abstract

Open University Malaysia (OUM) provides flexible educational opportunities through Open and Distance Learning (ODL), targeting working adults and professionals. Ensuring learner engagement and satisfaction in an ODL environment remains a significant challenge. To address this, OUM implemented HyperText Mark-up Language 5 Package (H5P), an interactive platform for creating engaging self-instructional materials (SIMs). This study examines the impact of H5P on learner satisfaction, focusing on: (1) the extent to which H5P enhances satisfaction and (2) the most effective features of H5P. A mixed-method approach was adopted, involving an online survey of 287 undergraduate and postgraduate students. Quantitative data measured satisfaction levels, while qualitative responses identified effective H5P features. Results showed 75% of postgraduates and 65% of undergraduates were very satisfied with H5P's ability to enhance understanding of course content, while 24% and 29%, respectively, were satisfied. In terms of engaging learning materials, 93% of postgraduates and 79.5% of undergraduates agreed that they were engaging. These findings indicate broad approval of H5P's interactive and engaging features. This study highlights several implications for instructional design in ODL. Integrating H5P elements, such as quizzes and videos, can significantly improve learner satisfaction. Training educators to effectively utilise H5P can maximise its benefits, while tailoring content to diverse learner needs enhances its overall impact. By leveraging H5P's potential, ODL institutions like OUM can foster learner-centric experiences that enhance engagement, motivation, and the sustainability of online education. This research underscores the importance of innovative tools like H5P in advancing the quality of ODL practices.

Keywords: *Open and Distance Learning (ODL), Self-Instructional Materials (SIMs), Interactive Digital Tools (H5P), Learner Satisfaction, Instructional Design*

1.0 Introduction

As the demand for Open and Distance Learning (ODL) continues to grow, the need for engaging and interactive self-instructional materials (SIMs) has become more critical than ever. Instructional designers play a crucial role in the development and production of SIMs, ensuring that the content is pedagogically sound, engaging, and tailored to meet the diverse learning needs of students (Shawira et al., 2022a). In recent years, the proliferation of ODL has become a key element in the transformation of higher education, particularly in accommodating the needs of working adults and professionals seeking flexibility in their learning journey. The shift towards ODL offers a range of opportunities for students who require an adaptable approach to education, often balancing their studies with professional or personal commitments. Open University Malaysia (OUM) has been at the forefront of this movement, adopting innovative strategies to ensure the sustainability and success of ODL initiatives. Despite the flexibility and accessibility of ODL, maintaining learner engagement and satisfaction remains a critical challenge that institutions must address to ensure the long-term effectiveness of this educational model. The integration of interactive digital tools in OUM's self-instructional learning materials, such as the HyperText Mark-up Language 5 Package (H5P), has emerged as a promising solution to enhance learner experience, engagement, and satisfaction in the ODL environment.

This study explores the impact of H5P on learner satisfaction in an ODL setting, with a specific focus on OUM. The study is aimed at addressing two primary research questions: (1). To what extent does the use of H5P enhance learner satisfaction in an ODL environment? (2) Which specific features of H5P are most effective in achieving this outcome? By addressing these questions, the study sought to explore the relationship between interactive learning tools and learner satisfaction in the context of ODL, offering insights into how such tools can improve the overall educational experience for both postgraduate and undergraduate learners.

2.0 Literature Review

2.1 The role of ODL in higher education

ODL has gained increasing prominence as a flexible and accessible alternative to traditional face-to-face education. The concept of "openness" in ODL is fluid and often misunderstood. This desktop review examines the degree of openness in ODL, focusing on entry requirements, teaching approaches, communication, curriculum flexibility, and assessment (Maphosa & Bhebhe, 2020). According to Ahmad et al. (2013), ODL refers to the provision of flexible educational opportunities in terms of access and multiple modes of knowledge acquisition. ODL is characterised by the physical separation of learners from the institution, with a focus on independent learning supported by various forms of communication (Holmberg, 2005). The mode of ODL is particularly appealing to individuals who may not have the time or resources to attend conventional educational institutions due to personal or professional obligations. As a result, ODL has become a key driver in broadening access to higher education, contributing to lifelong learning, and meeting the educational needs of diverse populations.

OUM, in particular, has been a leader in the development and implementation of ODL strategies in Malaysia. By leveraging technology and innovative pedagogical approaches, OUM offers

flexible educational opportunities designed to meet the needs of adult learners and working professionals. Despite the growing popularity of ODL, challenges remain in ensuring that learners remain motivated, engaged, and satisfied with their educational experiences. According to Moore and Kearsley (2011), learner satisfaction is a critical factor in the sustainability of ODL programs. This study seeks to address this challenge by examining the role of interactive digital tools, such as H5P, in improving learner satisfaction in ODL settings.

2.2 The importance of learner engagement and satisfaction in ODL

Learner engagement and satisfaction are essential components of successful ODL programs. Research has shown that learners who are more engaged with their course content and feel satisfied with their learning experience are more likely to persist in their studies and achieve positive outcomes (Kuh et al., 2008). In the context of ODL, where learners often study independently and at their own pace, maintaining engagement can be particularly challenging. As ODL learners typically have less direct interaction with instructors and peers than in traditional learning environments, it is essential to implement tools and strategies that foster a sense of connection and engagement with the material.

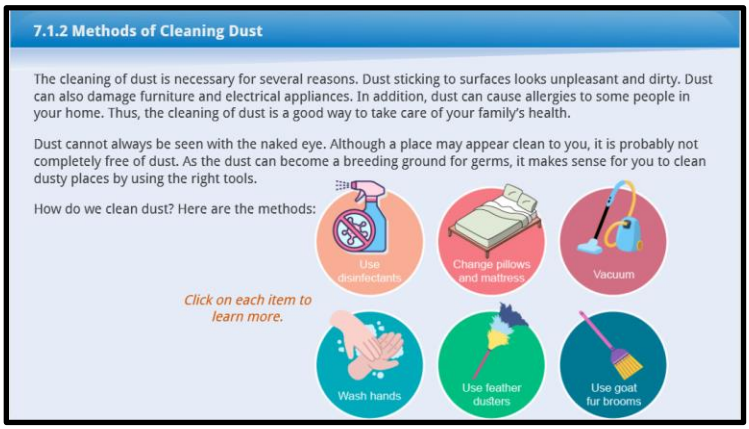
One approach that has gained traction in recent years is the use of interactive digital content, which has been shown to promote learner engagement and satisfaction (Bishop & Verleger, 2013). H5P, in particular, has emerged as a valuable tool for creating interactive learning experiences that can help sustain learner motivation and engagement in ODL environments. This study explores the extent to which H5P can enhance learner satisfaction in ODL settings and identify the specific features that contribute to this outcome.

2.3 HyperText Mark-up Language 5 Package (H5P) in ODL: Enhancing learner engagement

H5P is an open-source tool that enables the creation of interactive learning materials, including quizzes, presentations, videos, and interactive timelines, among others. The platform's versatility and ease of use make it an ideal tool for educators and instructional designers seeking to enhance learner engagement in ODL settings. In addition to enhancing engagement, H5P allows for the creation of content that promotes active learning, which is crucial for sustaining learner motivation and understanding of course material.

At OUM, the implementation of H5P module (see Figure 1) in the ODL environment has been met with positive feedback from learners. The platform's ability to create engaging, interactive content has been instrumental in improving learner satisfaction, particularly among postgraduate and undergraduate students.

Figure 1: Examples of Interactive H5P Module



2.4 Impact of H5P on Learner Satisfaction

The relationship between learner satisfaction and the use of digital tools in ODL is well documented in the literature. According to Alqurashi (2019), learner satisfaction is influenced by factors such as course design, technology use, and the quality of interaction between learners and instructors (see Figure 2). In the context of ODL, where learners often study in isolation, the use of technology to facilitate interaction and engagement is particularly important. H5P, with its wide range of interactive features, provides learners with the opportunity to engage with course content in a more meaningful and interactive way.

Figure 2: Quality of Interaction between Learner and Instructor

2.5 The Features of H5P for Various Fields of Study

The coronavirus disease 2019 (COVID-19) pandemic has significantly accelerated the shift toward asynchronous remote learning, presenting challenges in maintaining student engagement. This shift has underscored the need for the continuous development of learning materials and the adaptation of instructional strategies to meet students' evolving needs in online and blended environments (Shawira et al., 2022a). In response to these challenges, the integration of interactive tools such as H5P and Moodle has become essential, as both tools have been shown to enhance e-learning by providing engaging and enjoyable learning experiences, thereby boosting student motivation (Mutawa et al., 2023).

H5P, a JavaScript-based collaboration framework, has been used effectively in creating interactive language learning media, such as quizzes and games, for English courses at the State Polytechnic of Surabaya. The study found that H5P-based learning materials were accessible, evaluative, and effective in improving engagement (Utari, 2022). This aligns with findings from other studies, such as Jacob and Centofanti's (2024) research on H5P's role in an undergraduate psychology course. Although no significant difference was observed in assessment scores, students who interacted with H5P resources expressed a preference for more interactive elements, highlighting their value in enhancing the learning experience.

H5P's capability to foster critical thinking and active learning is further emphasised in various studies. For instance, Singleton and Charlton (2019) discuss how H5P content can be used to create rich HTML5-based interactive resources such as case studies, 3D images, and quizzes. This content not only encourages flexibility in learning environments but also offers automatic feedback, enhancing students' learning processes. Similarly, research by Gil-García et al. (2023) found that students engaged in interactive H5P activities in an MSc course on Wind Energy scored higher (8.4/10) compared to those in traditional online activities (7.4/10). Both students and teachers recognised the tool's positive impact on motivation and participation, suggesting the digital environment is key to fostering skills and competencies in higher education.

In health education, H5P has been particularly effective. Sinnayah et al. (2021) explored its use in first-year physiology courses, where it enabled self-paced, self-directed learning. This study highlights the importance of integrating educational technologies like H5P to enhance learning in complex subjects such as anatomy and physiology. Similarly, Killam and Luctkar-Flude (2021) showed that H5P-based virtual simulations in a family assessment course fostered creativity and improved the learning experience, demonstrating the versatility of H5P across disciplines.

The broader educational potential of H5P is also demonstrated in its application in fields such as chemistry. Kartimi et al. (2023) examined its use in understanding stereoisomers through interactive videos, although they found no relationship between video interaction and learning style. They suggested that more features and additional cognitive topics should be explored in future research. Ramliyana and Ramdhan (2020) took a different approach by leveraging H5P to create Indonesian language tests, which students could access via smartphones, demonstrating how H5P adapts to the unique learning styles of Generation Z students in Indonesia.

Across these studies, a clear theme emerges: H5P's adaptability and interactivity make it a powerful tool for enhancing engagement, motivation, and learning outcomes in diverse educational contexts. Whether in language learning, psychology, health education, or science, H5P fosters immersive and flexible learning experiences that meet the evolving needs of learners in an increasingly digital world (Kiryakova, 2022).

3.0 Methodology

The research methodology employed a quantitative approach to analyse the data collected from the survey. The methodology is as follows:

- The quantitative data from the closed-ended questions were analysed using descriptive statistics, including mean and percentage, to determine overall satisfaction levels and the perceived effectiveness of H5P among postgraduate and undergraduate learners.
- The survey responses were categorised based on learner satisfaction levels—ranging from "very dissatisfied" to "very satisfied." The proportion of satisfied and very satisfied learners was calculated to gauge the overall impact of H5P on learner satisfaction.
- A comparative analysis was conducted between postgraduate and undergraduate learners to identify any differences in satisfaction levels and feature preferences.

3.1 Data collection

The primary data for this study was collected through an online survey administered to postgraduate and undergraduate students at Open University Malaysia (OUM). A total of 287 learners participated in the survey, comprising both postgraduate (n=148) and undergraduate (n=139) respondents. The survey aimed to gather learners' feedback on their experiences using H5P as part of their ODL courses and their overall satisfaction with the platform. The participants were selected using a random sampling method, open to students who had used H5P in at least one course during their studies. The survey was distributed electronically through the university's learning management system (LMS). Participation was voluntary, and the respondents answered based on the H5P learning material subjects.

3.2 Survey design

The survey included both closed-ended and open-ended questions, allowing for quantitative and qualitative data collection. However, in this study only close ended questions are covered. The closed-ended questions used a Likert scale to measure learner satisfaction with H5P, with options ranging from "very dissatisfied" to "very satisfied." The key areas of focus in the survey included are as shown in Figure 3.

Figure 3: Key Areas of Focus in the Survey

This research will focus on three aspects that are perceived enhancement of understanding of course content, the activities are useful to students and the contents are systematically organised. Additionally, open-ended questions provided respondents with the opportunity to elaborate on their experiences with H5P, allowing the researchers to gather more in-depth insights into learners' perspectives.

3.3 Characteristics of Respondents

Table 1 listed the characteristics of the respondents which the diversity of the learners' educational levels and their varying degrees of familiarity with online learning, which may impact their experiences and satisfaction with H5P. The survey consisted of 52% postgraduate learners and 48% undergraduate learners. The postgraduate group had more familiarity with ODL and online tools, which may have influenced their perceptions of H5P. In contrast, undergraduate learners generally had limited prior experience with online learning platforms.

Table 1: Characteristics of Respondents

Respondents	**Number of Respondents**	**Characteristics**
Postgraduate learners	148 respondents (52% of total sample)	This group included learners enrolled in master's and doctoral programs. Most postgraduate learners had previous experience with ODL and online learning tools, which could influence their perceptions of H5P.

Undergraduate learners	139 respondents (48% of total sample)	This group consisted of individuals pursuing bachelor's degrees across various fields. Many undergraduate learners had limited prior experience with online learning platforms.

3.4 Limitations of the Methodology

The limitations of the methodology are shown in Table 2. These limitations suggest that while the study provides valuable insights, future research could benefit from larger, more controlled samples and alternative methods to reduce potential biases.

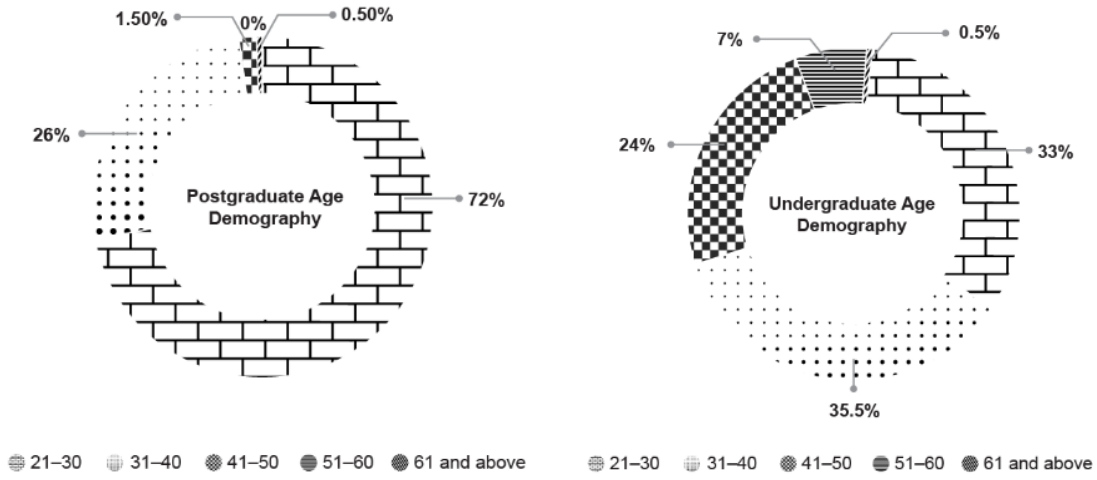
Table 2: Limitations of Methodology of the Study

Limitations of Methodology	Descriptions
Sample size	Although 287 respondents provided useful data, a larger sample size could more robust insights, especially for identifying differences in satisfaction across different fields of study or learner demographics.
Sampling method	The use of random sampling may limit the generalisability of the fin Respondents may answer more than once because the independent variable H5P subject. Meaning if the respondent completed more than one H5P su he or she can answer more than once.
Self-reporting bias	Since the data were collected through self-reported surveys, there is a poss of biases, such as social desirability bias, where respondents may overrepor satisfaction levels.

4.0 Findings

The study examined the impact of the HyperText Mark-up Language 5 Package (H5P) on learner satisfaction in an Open and Distance Learning (ODL) environment, specifically within Open University Malaysia (OUM). A survey of 287 postgraduate and undergraduate learners provided critical insights into how H5P influences their learning experiences. The results indicate a generally high level of satisfaction with H5P, with the majority of learners expressing that the platform positively impacted their understanding of course content and overall learning satisfaction. In terms of demography, the comparison between age demography is shown in Figure 4. From the charts, it is evident that postgraduate students are primarily from 21 to 30 and 31 to 40 age groups, with almost two thirds or 72% between the ages 21 to 30 years old. As for the undergraduate students, there are more evenly distributed with 35.5% from the 31 to 40 age group, and 33% and 24% from the age groups 21 to 30 and 41 to 50 respectively.

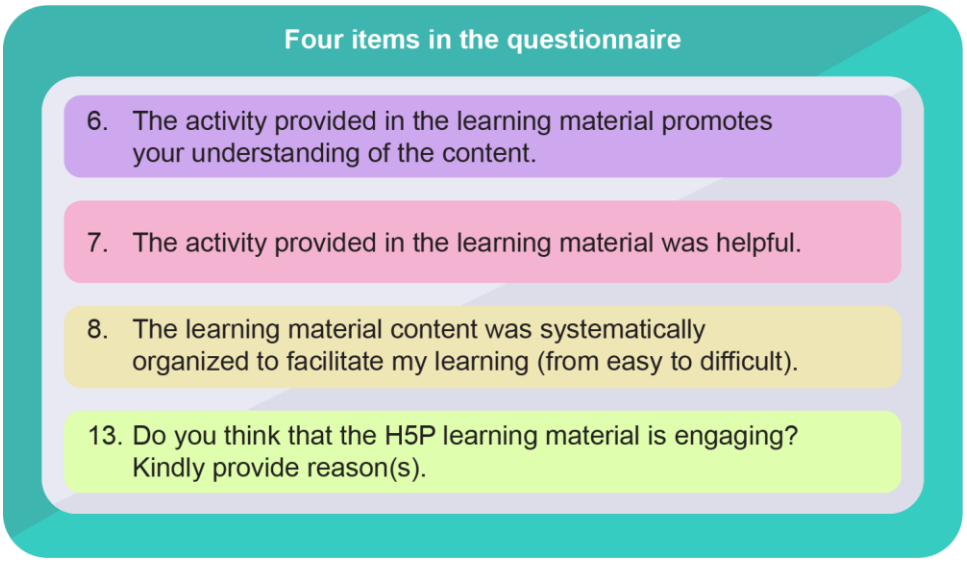
Figure 4: Comparison between postgraduate and undergraduate students in terms of age



4.1 Learner Satisfaction with H5P

The survey results revealed a strong positive reception of H5P among both postgraduate and undergraduate learners. The paper covers four items in the questionnaire as shown in Figure 5. The items comprise two aspects. The first three items fall under readability aspect, and the last item on whether H5P is engaging to the students.

Figure 5: Questionnaire items of numbers 6 to 8 and 13



For Question 6 the postgraduate respondents, 24% reported being "satisfied," while a significant 75% expressed that they were "very satisfied" with the use of H5P in promoting their understanding. Meanwhile, 29% of undergraduate learners indicated being "satisfied," and 65% reported being "very satisfied" with the platform in terms of this aspect. For Question 7 in terms

of learning materials being helpful to students, 72% of postgraduate respondents were very satisfied with the helpfulness of H5P learning material and another 26% were satisfied. However, 64% of respondents from undergraduate programs were very satisfied and 24% were satisfied.

For Question 8, the learning material content being systematically organised, 74% of postgraduates were very satisfied followed by 24% satisfied. In terms of undergraduate respondents, 63% of respondents from the undergraduate programs were very satisfied and another 27% were satisfied. The findings are summarised in Table 3.

Table 3: Comparisons Between the Levels of Satisfaction of Postgraduate and Undergraduate Students in OUM

Student Level	Level of Satisfaction	Question Numbers		
		Q6 (%)	Q7 (%)	Q8 (%)
Postgraduate	Very satisfied	75	72	74
	Satisfied	24	26	24
	Neutral	0	1	1
	Dissatisfied	0	0	0
	Very dissatisfied	1	1	1
Undergraduate	Very satisfied	65	64	63
	Satisfied	29	24	27
	Neutral	4	11	8
	Dissatisfied	1	1	1
	Very dissatisfied	1	0	1

For mean of ratings, the summary for both postgraduate and undergraduate is shown in Table 4. For all three questions, postgraduate students score higher compared to undergraduate students. Postgraduate students reported a satisfaction score of 4.73 for Question 6, 4.69 for Question 7, and 4.71 for Question 8. These scores indicate consistently high levels of satisfaction across all three questions, with Question 6 receiving the highest score. In comparison, undergraduate students reported slightly lower satisfaction scores, with 4.55 for Question 6, 4.50 for Question 7, and 4.52 for Question 8. Although these scores are still relatively high, they are slightly lower than those of the postgraduate students. Overall, postgraduate students expressed marginally higher satisfaction than undergraduate students across all three questions. The differences in scores are small but noticeable, suggesting that both groups are generally satisfied, with postgraduates being slightly more so.

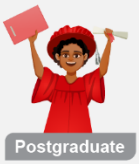
Table 4: Comparison between the Levels of Means of Rating of Postgraduate and Undergraduate Students in OUM

Students Level	Question Numbers		
	Q6	Q7	Q8
Postgraduate	4.73	4.69	4.71
Undergraduate	4.55	4.50	4.52

These high satisfaction rates suggest that H5P's interactive learning content effectively meets the needs of learners in the ODL environment. The platform's capacity to create engaging and dynamic content, such as quizzes, interactive videos, and presentations, appears to foster a deeper understanding of course materials. This aligns with previous research indicating that learner engagement is a key driver of satisfaction and success in ODL settings (Kuh et al., 2008).

However, there seems to be a slight difference between postgraduate students and undergraduate students, with the former being more satisfied than the latter. Postgraduate students, who may have more experience with independent learning and research, might appreciate the flexibility and interactivity of H5P to a greater extent. On the other hand, undergraduates, who might still be adjusting to the self-directed nature of ODL, could find the platform less intuitive in some aspects. In Question 13, which included both open and closed-ended questions, "Do you think that H5P learning material is engaging?" 93% of postgraduates affirmed its engaging nature, while 79.5% of undergraduates concurred (see Figure 6).

Figure 6: Level of Satisfaction on H5P as an Engaging Learning Material as stated Question 13

Student Level	Response	Percentage
 Postgraduate	Yes	93%
	No	1%
	No comment	6%
 Undergraduate	Yes	79.5%
	No	13.5%
	No comment	7%

Reason:

YES

- It is more interactive and fun
- Attractive interface
- Easy to access
- Makes subjects easier to understand
- Relatable to current industry need

NO

- Lack of video content
- Not bilingual
- Lack of tests/quizzes

4.2 Features of H5P that Contribute to Satisfaction

The interactive features of H5P, particularly quizzes, interactive videos, and presentations, were highlighted by learners as particularly effective in enhancing their learning experience. These elements contribute to more active learning, allowing learners to engage with content in a way that is both participatory and reflective. Active learning strategies, such as those facilitated by H5P, have been shown to promote higher levels of learner engagement and satisfaction by encouraging deeper cognitive involvement with the material (Bishop & Verleger, 2013).

In addition to fostering active engagement, H5P's interactivity allows for immediate feedback through quizzes and assessments, which contributes to a more self-regulated learning environment. Self-regulated learning is particularly important in ODL contexts, where learners often study independently. The ability to receive immediate feedback helps learners identify areas of improvement, thus promoting a more personalised and effective learning experience. This feature

resonates with previous studies that emphasise the importance of feedback in enhancing learner satisfaction in distance learning environments (Alqurashi, 2019).

4.3 The Role of H5P in ODL Sustainability

The findings also suggest that H5P can play a crucial role in promoting the sustainability of ODL programs. One of the major challenges in ODL is sustaining learner motivation and engagement over time, given the physical separation between learners and instructors. Moreover, the positive reception of H5P among learners underscores the importance of integrating technology that aligns with their learning needs and preferences. Learners' satisfaction with H5P not only reflects its effectiveness as a learning tool but also suggests that such technologies can contribute to higher retention rates and reduced dropout rates in ODL programs. As learners remain engaged and satisfied, they are more likely to persist in their studies, ensuring the long-term sustainability of ODL institutions like OUM.

5.0 Discussion

The results of this study corroborate existing research on the importance of interactive learning tools in enhancing learner satisfaction in ODL environments. H5P's ability to provide active, engaging, and interactive SIMs content plays a critical role in improving learners' understanding of course materials and their overall satisfaction with the learning experience. The high levels of satisfaction reported by learners highlight the importance of integrating interactive digital tools in ODL. The interactive nature of H5P content fosters active learning, which is crucial for maintaining engagement in ODL environments where learners often study independently. Furthermore, the immediate feedback provided through quizzes and assessments allows for more self-regulated learning, contributing to higher levels of satisfaction and, potentially, improved learning outcomes.

However, the slight differences in satisfaction levels between postgraduate and undergraduate learners suggest that more tailored approaches may be necessary to fully meet the needs of diverse learner groups. When it comes to the open-ended question of engaging learning experience, a few undergraduates suggested more videos, animations, and gamification. On the other hand, postgraduates were mostly concerned about references. Future research should explore how different learner groups interact with H5P and how its features can be optimised for various educational levels.

Overall, the findings of this study emphasise the effectiveness of H5P in enhancing learner satisfaction in ODL environments. The platform's interactive features contribute to more engaging and effective learning experiences, which are essential for the sustainability of ODL programs. As technology continues to evolve, the integration of tools like H5P will be critical for ensuring that ODL remains a viable and effective option for learners worldwide.

6.0 Conclusion and Recommendations

This study demonstrates that H5P can be a valuable tool for enhancing learner satisfaction in ODL settings. By providing learners with engaging, interactive content, H5P has the potential to

improve the overall quality of the learning experience and contribute to the sustainability of ODL programs. The positive reception of H5P among both postgraduate and undergraduate learners at OUM underscores the importance of incorporating interactive digital tools in ODL environments to maintain learner engagement and satisfaction. As ODL continues to evolve, it is essential for institutions to adopt innovative approaches that enhance the learners experience and ensure the long-term success of their programs.

The findings suggest that H5P plays a pivotal role in enhancing the overall learner experience by creating interactive and engaging learning materials. The high levels of satisfaction reported by both postgraduate and undergraduate learners—75% of postgraduates and 65% of undergraduates being "very satisfied" with H5P—underscore its effectiveness in promoting better understanding of course content. The interactive nature of H5P, which allows learners to actively engage with the material through quizzes, videos, and other forms of multimedia, contributes significantly to their satisfaction and overall learning experience. These results support the conclusion that incorporating interactive digital tools like H5P is crucial for maintaining learner engagement and satisfaction in ODL environments. By optimising more H5P elements in the teaching and learning process, these features can foster a deeper understanding of course materials and help sustain learner engagement and motivation over time.

6.1 Limitations of the Research

Despite the promising findings, this research is not without limitations. Firstly, the study is based on a sample size of 250 respondents, which may not be fully representative of the broader population of ODL learners using H5P learning materials. A larger sample size could provide more comprehensive insights into the impact of H5P across different learner demographics and educational contexts. Secondly, the study relies on self-reported data through surveys, which may introduce biases such as social desirability bias or inaccurate recall on the part of the respondents. While the feedback provides valuable insights, the subjective nature of self-reporting limits the ability to fully assess the objective impact of H5P on learner outcomes.

6.2 Recommendations for Future Studies

To build on the findings of this research, future studies should consider expanding the sample size to include a more diverse group of learners across different educational institutions and geographic regions. A larger, more diverse sample would provide a more comprehensive understanding of how H5P affects learner satisfaction in various ODL settings. Additionally, future research should explore the long-term impact of H5P on academic performance and learning outcomes beyond learner satisfaction. This could include longitudinal studies that track learners' academic progress over time, comparing those who use H5P with those who do not, in order to assess its impact on knowledge retention, course completion rates, and overall academic success.

Moreover, future research could investigate the specific features of H5P that are most effective in different educational contexts. While this study identifies certain features, such as interactive videos and quizzes, as being particularly engaging, further research could provide more granular insights into which elements work best for different types of learners. For instance, undergraduate versus postgraduate; and science, technology, engineering, and mathematics (STEM) versus

humanities. Finally, a more in-depth qualitative approach, such as interviews or focus groups, could complement the quantitative findings by providing deeper insights into the reasons behind learners' satisfaction or dissatisfaction with H5P. Understanding the learners' experiences and challenges in greater detail could inform instructional design practices and lead to the development of more tailored and effective learning tools for ODL environments.

In conclusion, while H5P in SIMs has shown great potential in enhancing learner satisfaction and engagement in ODL settings, there is still much to learn about its broader impact on learning outcomes and its flexible applications across different educational contexts. Further research will be key to unlocking the full potential of H5P and similar digital tools in the future of distance education.

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