EXPLORING THE EFFICACY OF ANIMATED CHARACTERS AS ONLINE DEMONSTRATORS TO IMPROVE THE LEARNING EXPERIENCE OF STUDENTS: A CASE STUDY AT THE UNIVERSITY OF BOTSWANA

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Abstract:

This research investigated the effectiveness of animated characters as online demonstrators in enhancing the learning experience of University of Botswana students. The study employed the Multimedia Learning Theory (Mayer, 2008) to understand the impact of animated characters on student learning. The study employed a mixed-methods approach, combining survey and interviews for data collection. Quantitative findings revealed a mean rating of 3.00, signifying a positive perception of animated character integration. Thematic analysis provided qualitative insights, emphasizing the captivating nature of animated characters in creating an engaging online learning environment. However, challenges such as technical glitches and diversity in learning preferences were acknowledged. The research underscores the importance of addressing technical issues and aligning animated character usage with pedagogical goals. Recommendations included ongoing assessments, resource allocation, and flexibility in integration to accommodate diverse learning preferences. By bridging theory and practice, this research contributes valuable insights for educators, instructional designers, and policymakers seeking to optimize the use of animated characters in higher education.

Keywords: *Animated characters, online demonstrators, student learning, University of Botswana, learning experience***.**

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Introduction

Animated characters as online demonstrators refer to virtual characters or figures that are created using animation techniques and integrated into online educational platforms or courses to serve as interactive guides, instructors, or assistants. These characters are designed to engage and instruct students in a digital learning environment. They often have lifelike movements, expressions, and behaviors, making them more dynamic and visually appealing than traditional static instructional materials. The primary purpose of these animated characters is to enhance the learning experience by providing a more engaging and interactive educational atmosphere. They may guide students through course content, explain concepts using visual aids, and create a more personalized and enjoyable learning environment. The use of animated characters aims to capture students' attention, increase retention of information, and potentially improve overall learning outcomes in online education.

The surge in online learning within universities globally, including the University of Botswana (UB), has been significant in recent years. Factors such as accommodating a growing student population, the cost-effectiveness of online education, and flexibility for learners contribute to this expansion (Maor, 2012). However, challenges, such as asynchronous communication, limited social interaction, and decreased student motivation (Ayodele & Ogunseye, 2020), underscore the need for innovative strategies.

Asynchronous communication in online learning results in delayed responses, reduced immediate clarification opportunities, and a sense of disconnectedness among students. Limited social interaction further exacerbates these issues, as traditional face-to-face settings afford spontaneous discussions, group activities, and social bonding. Online learning often provides fewer opportunities for such interactions, potentially leading to feelings of isolation and reduced engagement. Moreover, the absence of physical presence and peer competition in online environments can negatively impact student motivation, manifesting as procrastination, reduced participation, or a general lack of enthusiasm for the course. In response to these challenges, instructors are compelled to explore effective strategies, one being the integration of animated characters as online demonstrators (Ayodele & Ogunseye, 2020; Chen et al., 2014; Han, 2018). Animated characters, known for capturing attention and simplifying complex concepts through visual representations, have the potential to elevate engagement and enhance learning outcomes.

It is against this backdrop that this study aims to investigate the impact of integrating animated characters as online demonstrators on the student learning experience in online courses at the University of Botswana. The main purpose of this study is to investigate the effectiveness of animated characters as online demonstrators in enhancing student learning experience at the University of Botswana. The study is guided by the following research questions.

1. How does the integration of animated characters as online demonstrators influence the student learning experience?
2. What challenges and limitations are linked to integrating animated characters as online demonstrators in higher education, particularly within the context of the University of Botswana?
3. What suggestions can be proposed to enhance the use of animated characters as online demonstrators, tackle challenges, and elevate the online learning experience at the University of Botswana?

Literature review

The rapidly evolving realm of online learning in higher education has witnessed innovative strategies aimed at enriching the educational experience, with the integration of animated characters as online demonstrators emerging as a topic of significant interest. This study delves into the research and concepts surrounding the utilization of animated characters in online education, offering a comprehensive exploration of both its advantages and the challenges it presents.

The incorporation of animated characters in online courses brings forth compelling benefits, as highlighted by Chen et al. (2014), who emphasises their efficacy in engaging students through visual appeal and interactivity, which contribute to heightened levels of engagement. These characters create a dynamic learning environment that effectively addresses challenges related to asynchronous communication, fostering a more interactive and engaging experience. Furthermore, their ability to simplify complex concepts aligns with the principles of multimedia learning theory, which emphasises the crucial role of visual aids in the learning process (Mayer, 2008).

Additionally, animated characters play a pivotal role in increasing students' motivation and interest in course content, as noted by Han (2018). Students often perceive these characters as personable and relatable, thus establishing a sense of connection that fosters sustained motivation and engagement. This becomes particularly crucial in addressing the observed decrease in student enthusiasm within online learning environments (Ayodele & Ogunseye, 2020). The notion of personalization, wherein students feel a connection to the characters, is identified as essential in online learning to validate individual learning journeys (Dixson, 2015).

However, alongside these advantages, it is imperative to acknowledge the potential challenges associated with the integration of animated characters in online education. Technical issues, including glitches and software compatibility problems, pose a significant challenge (Ayodele & Ogunseye, 2020). These technical difficulties may disrupt the learning process, and thus underscore the need for robust technical support and reliable infrastructure (Ansong & Darkwa, 2016). Furthermore, the risk of animated

characters becoming distractions if not appropriately integrated into the curriculum is a noteworthy concern and requires a delicate balance between engagement and potential disruption (Chen et al., 2014).

Recognizing the diversity in learning preferences among students is another critical consideration. While some students find animated characters engaging, others may prefer alternative teaching methods (Han, 2018). Acknowledging these differences in learning styles is crucial to ensure that the integration aligns with pedagogical goals and the nature of the course material (Dunn & Griggs, 1995). Moreover, the creation of high-quality animated characters can be resource-intensive in terms of time and budget and therefore highlight the need for careful cost considerations (Chen et al., 2014). Institutions must weigh the benefits of animated characters against their resource constraints to make informed decisions about their integration.

The integration of animated characters as online demonstrators in higher education holds significant promise for enhancing the online learning experience by engaging students, simplifying complex concepts, and increasing motivation. However, amid the acknowledged advantages, a critical gap exists in understanding and addressing the challenges associated with this integration. The literature review identifies technical issues, potential distractions, diverse learning preferences, and resource constraints as potential impediments to the successful incorporation of animated characters in online courses. The lack of an in-depth exploration of these challenges poses a potential barrier to the effective utilization of animated characters in higher education.

Theoretical framework

The theoretical framework for this study is grounded in educational technology, instructional design, and cognitive psychology, with a focus on understanding the effectiveness of animated characters as online demonstrators in augmenting the student learning experience, addressing the identified gap in the literature. Central to this framework is the Multimedia Learning Theory (Mayer, 2008), which underlines the role of visual aids, such as animated characters, in processing and comprehending complex information. The study leverages this theory to explore how animated characters contribute to making abstract ideas more accessible, and aligns with the literature review's emphasis on the potential of animated characters to simplify complex concepts.

The framework also incorporates constructs from engagement and interactivity (Chen et al., 2014) that emphasises the captivating nature of animated characters and their ability to create a dynamic learning environment. Motivation and personalization (Han, 2018) are integral components, drawing on Han's research to understand how animated characters, perceived as personable and relatable, can foster a sense of connection and increase student motivation. Additionally, the framework addresses challenges and technical issues (Ayodele & Ogunseye, 2020), recognizes potential disruptions to the

learning process and the need for robust technical support. Lastly, acknowledging diverse learning preferences (Han, 2018; Dunn & Griggs, 1995) is vital, considering variations in student responses to animated characters and the impact of different learning styles on their effectiveness.

This conceptual framework guides the study in assessing the multifaceted impact of animated characters on the online learning experience, by considering the potential challenges and technical issues associated with the integration of animated characters, this construct is essential for understanding the impediments and limitations that may affect the overall effectiveness of animated characters in the online learning environment (Ayodele & Ogunseye, 2020). Acknowledging the diversity of student learning preferences, particularly in response to animated characters, is a crucial aspect of the framework. This construct aims to explore how different learning styles impact the effectiveness of animated characters (Han, 2018; Dunn & Griggs, 1995)

Methodology

Research design

The methodology adopted a mixed methods approach to comprehensively explore the impact of animated characters as online demonstrators on the learning experience of University of Botswana students. The study focused on undergraduate students enrolled in online courses at the University of Botswana, ensuring participants had direct experience with online learning. The use of stratified random sampling, based on academic disciplines, aimed to capture variations in experiences across different programs, enhancing the generalizability of the findings. A total of 200 undergraduate students were targeted from the faculties of Business, Education, Engineering, Humanities, Health Sciences, Science, and Social Sciences. Two primary data collection instruments were employed: surveys and interviews. Ethical considerations were prioritized throughout the study. Participants received a thorough introduction to the study to ensure that they provided informed consent. Confidentiality and anonymity were maintained to protect the participants' identities and personal information.

Surveys

A total of 200 questionnaires was distributed and 180 were successfully completed by the respondents. This indicates a completion rate of 90%, reflecting strong engagement with the survey. The high completion rate suggests a robust level of participation and willingness among the surveyed participants. The surveys were distributed electronically for convenience, ensuring a broad reach and ease of access for participants. These surveys aimed to gather quantitative data on students' perceptions of the impact of animated characters on their online learning experience, as well as any challenges they faced.

For the construct of "Potential Challenges and Technical Issues," participants responded to statements regarding the impact of technical glitches, software compatibility problems, disruptions, technical support, and bandwidth limitations when interacting with animated characters in online courses. The Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), provided a varied evaluation of the severity and frequency of these challenges, offering insights into the effectiveness of animated characters and associated technical considerations.

Table 1: Likert Scale Items

Constructs		Likert Scale Items
Potential Challenges and Technical Issues	PCT1	To what extent do technical glitches affect your interaction with animated characters in online courses?
	PCT2	Please rate the impact of software compatibility problems on your overall experience with animated characters.
	PCT3	How frequently do you encounter disruptions in the learning process due to technical difficulties related to animated characters?
	PCT4	Evaluate the level of technical support you receive when facing challenges with animated characters in online courses.
	PCT5	Rate the significance of potential bandwidth limitations in hindering your engagement with animated characters during online learning.
Diversity of Student Learning Preferences	PSLP1	Indicate your preference for learning with animated characters in online courses.
	PSLP2	How well do animated characters align with your individual learning style preferences?
	PSLP3	Rate your motivation and engagement when animated characters are integrated into the online course material.
	PSLP4	To what extent do you find animated characters relatable and personable in the context of online learning?
	PSLP5	Please rate the importance of considering diverse learning preferences when integrating animated characters into online education.
Integration Of Animated Characters In Online Courses At The University Of Botswana	IACCUB1	The use of animated characters in online courses enhances my understanding of course content.
	IACCUB2	Animated characters make online courses at the University of Botswana more engaging and enjoyable.
	IACCUB3	The presence of animated characters in online courses helps to clarify complex concepts.
	IACCUB4	I believe that animated characters contribute positively to the overall learning experience in online courses.
	IACCUB5	The integration of animated characters in online courses enhances the sense of connection and interaction with course content.

In the "Diversity of Student Learning Preferences" construct, participants expressed their preferences for learning with animated characters, alignment with individual learning styles, motivation, engagement, relatability, and the importance of considering diverse learning preferences. This Likert scale, spanning from 1 to 5, allowed participants to articulate their experiences and perceptions regarding the integration of animated characters into online education, offering valuable data on the role of personal preferences in the learning process.

Interviews

The interviews aimed to gather in-depth insights into students' experiences with animated characters in online learning. The goal was to understand their perceptions, challenges, and preferences, and provides qualitative data to complement the survey results. 20 students were selected for semi- structured interviews, ensuring a diverse representation from different faculties and backgrounds. The interviews were semi-structured, allowing for flexibility in responses while ensuring coverage of key topics. Each interview was conducted individually to facilitate open and honest feedback. Appendix 1 provides the interview guide.

Data analysis

The collected data underwent both quantitative and qualitative analyses to provide a comprehensive understanding of the effectiveness of animated characters in the online learning environment at the University of Botswana.

Quantitative analysis

The quantitative data from the surveys were analyzed using descriptive statistics. This included calculating frequencies, percentages, means, and standard deviations for each Likert scale item. The following steps were taken:

1. **Data Cleaning**: The survey responses were first cleaned to remove any incomplete or invalid entries, ensuring the accuracy of the data set.
2. **Descriptive Statistics**: The responses to the Likert scale items were summarized to understand the central tendencies and dispersion of students' perceptions regarding the impact of animated characters on their learning experience. This helped in identifying general trends and common challenges faced by the students.
3. **Cross-tabulation**: Cross-tabulations were performed to explore relationships between different variables, such as the impact of animated characters across different faculties or academic disciplines. This provided insights into how experiences varied among different student groups.

Qualitative analysis

The qualitative data from the semi-structured interviews were analyzed using thematic analysis. This method allowed for an in-depth exploration of individual student experiences and perceptions. The following steps were followed:

1. **Transcription**: All interviews were transcribed verbatim to create a reliable data set for analysis.
2. **Coding**: The transcriptions were systematically coded to identify significant themes and patterns. Initial codes were generated based on the interview questions, and additional codes emerged from the data during analysis.

3. **Theme Development**: Codes were organized into broader themes that captured key aspects of the students' experiences with animated characters. This included themes such as engagement, clarity of complex concepts, and technical challenges.
4. **Triangulation**: The themes identified from the qualitative data were compared with the quantitative findings to ensure consistency and to provide a more nuanced understanding of the impact of animated characters. This methodological triangulation helped to validate the results and offered a holistic view of the research questions.

The combination of quantitative and qualitative data analysis provided a robust and multidimensional perspective on the effectiveness of animated characters in online courses. The detailed statistical summaries and rich thematic insights together contributed to a comprehensive evaluation of the learning experiences of University of Botswana students.

Findings and discussion

Survey data

SPSS was used to derive the measures of central tendency and standard deviation measures. The central tendency offered a central point of reference on conceptual constructs assessed and the standard deviation added depth by conveying the degree of variability in the participants' perceptions. This combined descriptive information provided a more enriched and accurate understanding of research participants' perceptions. The mean scores give an indication of the central tendency of participants' ratings for potential challenges and technical issues, while the standard deviation provides information about the consistency or spread of these ratings. The low standard deviation suggests a relatively consistent view among participants.

Table 2: Potential challenges and technical issues

	N	Minimum	Maximum	Mean	Std. Deviation
Potential Challenges and Technical Issues	198	1	5	3.03	.628
Valid N (listwise)	198				

On average, participants rated the potential challenges and technical issues in online learning as 3.03. This suggests a moderate perception of the level of challenges and technical issues among the students. The standard deviation of 0.628 is relatively low, indicating that there is relatively little variability in participants' responses. In other words, there is a fair amount of agreement among respondents regarding the perceived

challenges and technical issues. Integrating animated characters in online education at the University of Botswana offers engaging learning experiences but poses challenges such as technical issues and distractions.

Table 3: Diversity of student learning preferences

	N	Minimum	Maximum	Mean	Std. Deviation
Diversity of Student Learning Preferences	198	1	5	2.98	.647
Valid N (listwise)	198				

Recognizing diverse student preferences is crucial, demanding alignment with pedagogical goals and careful cost considerations (Ayodele & Ogunseye, 2020; Chen et al., 2014; Dunn & Griggs, 1995). The student gave a rating of 2.98 for the diversity of student learning preferences. This implies that, on average, the respondents believe there is a moderate level of diversity in learning preferences among students. With a relatively low standard deviation of 0.647, there is little variability in participants' responses, which indicates a considerable level of agreement among respondents regarding their perception of diversity in student learning preferences. The minimal variability indicates a substantial consensus among respondents regarding their views on the range of learning preferences among students, and this aligns with the literature's emphasis on recognizing diverse learning styles (Han, 2018; Dunn & Griggs, 1995).

The average student rating for the integration of animated characters in online courses at the University of Botswana was 3.00, indicating a perception that ranges from neutral to slightly positive (shown in Table 4). The standard deviation of 0.662 reflects a moderate level of variability in participant responses, signifying diversity in opinions. Although there is a central tendency centered on the mean, the noticeable degree of dispersion in opinions suggests that participants hold varying views on the integration of animated characters in online courses.

Table 4: Integration of animated characters in online courses at the University of Botswana

	N	Minimum	Maximum	Mean	Std. Deviation
Integration Of Animated Characters In Online Courses At The University Of Botswana	198	1	5	3.00	.662
Valid N (listwise)	198				

The findings, with a mean rating of 3.00 and low standard deviation (0.662) in the integration of animated characters, align with literature that emphasises engagement benefits (Chen et al., 2014; Han, 2018). While the positive mean suggests perceived advantages, the minimal variability indicates consensus. However, challenges mentioned in the literature, such as technical issues and distractions, should be vigilantly addressed (Ayodele & Ogunseye, 2020; Ansong & Darkwa, 2016; Chen et al., 2014). This study therefore highlights the need for further exploration to optimize integration (Dunn & Griggs, 1995; Dixson, 2015).

Interview data

Thematic analysis was done using the QADMiner version 6 software. Based on the research questions and the interview questions, the following themes and codes were derived from students' responses, as shown in Table 5. The interview comprised questions exploring the impact of visually appealing animated characters on engagement, changes in interest due to animated characters, the role of characters in clarifying complex concepts, experiences with technological challenges, and individual preferences regarding the use of animated characters in online courses.

Table 5*:* Student feedback on the use of animated characters in online learning

Themes	Codes	Excerpts
Enhanced Engagement	Visual Appeal	"• "I love how lively the animated characters make our online learning! They really grab our attention and keep us focused." • "The visual elements and animated characters make studying so much more enjoyable. It's like they bring the lessons to life!" • "The animated characters make our courses feel interactive and dynamic. They definitely help me stay interested and engaged throughout."
	Increased Interest	• "Since they added animated characters, I've been way more curious about what we're learning. It feels like it encourages us to dive deeper into the course materials." • "I've noticed I'm way more into the lessons now that there are animated characters. They make everything so much more interesting and engaging." • "The animated characters totally change how I feel about online learning. It's like they make everything more exciting and easier to stay focused on."
Clarity of Instruction	Concept Clarification	• "I love how the animated characters simplify complex ideas. It feels like having a personal tutor breaking down difficult concepts into understandable parts." • "When they use animated characters to visually explain concepts, it really improves my learning experience. It's like they make everything clearer and more accessible." • "Animated characters are a game-changer for me in understanding challenging topics. They clarify things and make the material much easier to grasp."
	Step-by-Step Guidance	• "I really appreciate how the animated characters guide me step-by-step through the course. It makes everything so much clearer and

Themes	Codes	Excerpts
		easier to understand." • "The guidance from animated characters helps me follow the lessons smoothly. It's like they lead me through the material in a structured way." • "Since they introduced animated characters, following the course has become much more organized. They break everything down step-by-step, which helps me stay on track."
Technological Challenges	Technical Glitches	• "I get really frustrated when the animations freeze or lag. It makes it hard to follow along and really impacts how effective the animated characters are supposed to be." • "When there are delays in the characters' movements, it totally disrupts the flow of the online course. It's hard to stay engaged with the material when this happens." • "Sometimes there are buffering issues that make interacting with the animated characters really difficult. It just doesn't feel smooth and makes the learning experience less enjoyable."
	Device Compatibility Issues	• "I'm having trouble accessing the animated characters because of device compatibility issues. It's really limiting my learning experience." • "Using different devices sometimes causes compatibility problems. It makes it hard to integrate the animated characters smoothly across all the platforms." • "The limitations of my device affect the uniformity of the online learning experience. Compatibility issues with the animated character features are especially frustrating."
Student Preferences	Varied Responses	• "I find the animated characters really helpful. They make the lessons more engaging and easier to understand." • "I actually prefer other instructional methods over animated characters. They don't really work for me as well as traditional teaching." • "Honestly, I think both methods have their benefits. Sometimes the animated characters are great, but other times I prefer more straightforward teaching approaches."
	Personalization	• "I love how the animated characters personalize the learning experience. It really aligns with my individual preferences and helps me learn better." • "The ability to personalize my learning with animated characters resonates with me. It makes the lessons feel more tailored to my needs." • "For me, the personalized approach through animated characters is a big plus. It fits my learning style and keeps me more engaged."

There are commonalities in the thematic analysis of research question 1 that align with the quantitative findings. The positive ratings for the integration of animated characters (3.00) support the identified themes, indicating that, on average, students perceive benefits in engagement and interest. One of the participants stated that "the vibrant and visually appealing animated characters create an engaging online learning environment, capturing students' attention effectively." The same sentiments are echoed by another

participant: “the animated characters serve as a catalyst for increased interest, transforming the online learning environment into a more dynamic and captivating space”. The acknowledgment of challenges such as technical glitches and device compatibility issues corresponds with the moderate ratings for potential challenges and technical issues (3.03) and one participant mentions that “students report occasional technical glitches, such as buffering issues, which hinder the smooth interaction with animated characters during online learning sessions." The thematic analysis provides qualitative insights, offering a nuanced understanding of students' experiences with animated characters, reinforcing the importance of addressing challenges while recognizing diverse preferences.

Based on research question 2, and the respective qualitative questions asked the following themes and codes were elected as noted from the students’ responses (shown in Table 4). The interview questions aimed to elicit insights on challenges in integrating animated characters in higher education. Participants shared experiences on technical issues, alignment with learning goals, engagement versus distraction balance, and the impact of resource constraints. These questions provided a nuanced exploration of the complexities surrounding animated character integration.

Table 6: Student feedback on technical and pedagogical challenges with animated characters in online learning

Theme	Codes	Excerpts
Technical Challenges	Software and Hardware Issues	"Frequent software crashes are really annoying and make it hard to use the animated characters smoothly. It messes up the whole learning experience." "I'm having a lot of trouble with compatibility issues on my device. It makes integrating the animated characters really difficult and affects how well I can learn." "The constant software crashes and device compatibility problems are really frustrating. They disrupt the flow of my lessons and make it hard to stay focused."
	Bandwidth Limitations	"Inadequate internet bandwidth is a big problem for me. It causes a lot of buffering and makes it hard to interact smoothly with the animated characters." "The buffering issues due to slow internet really disrupt my online learning sessions with the animated characters." "Poor internet bandwidth often leads to interruptions and makes using animated characters frustrating during my lessons."
Pedagogical Challenges	Alignment with Learning Objectives	"It's challenging to make sure the animated characters align with our learning goals. Sometimes they feel more like a distraction than a help." "I think it's important that the animated characters really add to the educational content and don't just serve as a distraction." "Finding a balance where the animated characters support our learning without distracting us is definitely a challenge."
	Diverse Learning Styles	"Meeting everyone's learning preferences with animated characters is tough. They might work well for some of us but not for others."

		"It's challenging to find a balance with animated characters because they don't suit everyone's learning style." "Adapting the animated characters to fit all our different learning preferences is hard. What works for one person might not work for another."
Engagement and Distraction	Engagement Benefits	"Animated characters definitely help me stay engaged, but if they're overused, they can become distracting and take away from the main content." "I appreciate how animated characters make the lessons more engaging, but too much of them can pull my focus away from the important material." "Sometimes, the animated characters are great for keeping my attention, but if they're used too much, they can end up distracting me from the key points."
	Attention Span	"Keeping my attention can be tough during long sessions, and sometimes the animated characters make it harder to focus for extended periods." "While animated characters help at first, they can make it difficult to stay focused during longer online classes." "Sometimes, the animated characters contribute to shorter attention spans, especially in lengthy sessions. It's hard to stay engaged for a long time."
Resource Constraints	Cost Considerations	"Integrating animated characters is expensive, and I know it's a big challenge for schools with tight budgets." "I've heard that developing and maintaining animated characters costs a lot, which can be tough for institution with limited funds." "Schools might struggle with the high costs of integrating animated characters, especially if they don't have a big budget for this kind of development."
	Technical Support	"Technical support for problems with animated characters is really limited, which makes it harder to use them effectively in online courses." "It's frustrating when there's not enough technical support for issues with animated characters. It complicates their integration into our classes." "Having limited tech support for animated character issues makes things more complex and sometimes affects how well they work in our online courses."

The study further reveals a moderate perception of challenges and technical issues in online learning (Mean: 3.03), showcasing fair agreement among participants. Students express a moderately acknowledged recognition of diverse learning preferences (Mean: 2.98), indicating substantial consensus and alignment with existing literature highlighting varied learning styles (Han, 2018; Dunn & Griggs, 1995). In tallying with this observation, a participant commented that "meeting the diverse learning preferences of students becomes challenging, as animated characters may resonate differently with individuals, making it a complex task to cater to everyone." Regarding the integration of animated characters, University of Botswana students convey a neutral to slightly positive perception (Mean: 3.00), with moderate variability in opinions, one participant

made the following reflection: “while animated characters enhance engagement for some, there's a delicate balance, as excessive use may lead”. Positive engagement benefits align with the literature (Chen et al., 2014; Han, 2018), emphasizing the positive aspects of incorporating animated characters. These findings underscore the unique perspectives of University of Botswana students, emphasizing the importance of addressing challenges and optimizing the integration of animated characters for effective online education at the institution.

Research question 3 aimed to explore potential enhancements for utilizing animated characters as online demonstrators, addressing challenges, and improving the online learning experience at the University of Botswana. Drawing insights from both descriptive and thematic analyses, where commonalities were identified, the study generated suggestions to optimize the use of animated characters, address challenges, and enhance the overall online learning experience at the University of Botswana. The findings from the study indicate a moderate perception of challenges and technical issues in online learning, with students expressing a fair level of agreement on these aspects (Mean: 3.03) (Ayodele & Ogunseye, 2020; Ansong & Darkwa, 2016; Chen et al., 2014). There is also a moderately acknowledged recognition of diverse learning preferences, with substantial consensus among participants (Mean: 2.98), aligning with existing literature highlighting varied learning styles (Han, 2018; Dunn & Griggs, 1995). Regarding the integration of animated characters, students convey a neutral to slightly positive perception (Mean: 3.00), with moderate variability in opinions (Chen et al., 2014; Han, 2018). To address these findings, several suggestions are proposed, including the provision of robust technical support, ensuring pedagogical alignment, balancing engagement and minimizing distractions, strategic resource allocation, student involvement and feedback mechanisms, professional development for educators, continuous optimization, and fostering collaboration and knowledge sharing (Ayodele & Ogunseye, 2020; Dixson, 2015; Chen et al., 2014). These suggestions aim to optimize the use of animated characters and enhance the overall online learning experience at the University of Botswana.

Conclusion

The research findings indicate a convergence between quantitative ratings and qualitative thematic analysis and emphasises the perceived benefits of integrating animated characters in online courses at the University of Botswana. Positive student ratings (Mean: 3.00) align with qualitative themes highlighting the engaging and transformative impact of animated characters on the online learning environment. While acknowledging challenges such as technical glitches and device compatibility issues, the study underscores the importance of addressing these issues to optimize the overall learning experience.

The moderate perception of challenges and technical issues (Mean: 3.03) suggests a fair consensus among participants and emphasises the need for proactive solutions. Students'

recognition of diverse learning preferences (Mean: 2.98) aligns with existing literature and emphasises the significance of catering for varied learning styles. The qualitative insights from thematic analysis provide a nuanced understanding of students' experiences and underscores the need for a balanced approach in addressing challenges and preferences.

Recommendations

To optimize the integration of animated characters as online demonstrators and enhance the learning experience at the University of Botswana, several recommendations are proposed. First, technical optimization is crucial. Addressing technical glitches and device compatibility issues will ensure a smoother and more reliable interaction with animated characters, thus enhancing the overall learning experience. Pedagogical alignment is also essential; the use of animated characters should be strategically aligned with pedagogical goals to ensure they contribute meaningfully to the educational content without becoming distractions.

Recognizing and accommodating diverse learning preferences is another key recommendation. Adopting a flexible approach to the integration of animated characters can help cater for the varied learning styles of students, making the learning process more inclusive and effective. Continuous assessment is necessary to keep the integration of animated characters relevant and effective. Regularly assessing and optimizing their use based on student feedback will help adapt to evolving preferences and technological advancements, and ensures the approach remains current and beneficial.

Lastly, resource allocation must be carefully considered. Allocating adequate resources for technical support and the development of animated characters is important, despite the cost implications. This will ensure a sustainable and effective integration of animated characters in online education, providing the necessary support to address any technical issues promptly and maintain the quality of the learning experience.

References

Ayodele, M. A., & Ogunseye, O. O. (2020). Efficacy of online tools for experimentation in enhancing students' academic performance and motivation in science: A systematic review. Heliyon, 6(1), e03173.

Bellotti, F., Kapralos, B., Lee, K., Moreno-Ger, P., & Berta, R. (2013). Assessment in and of serious games: An overview. Advances in Human-Computer Interaction, 495204.

Bosse, S., Breuer, H., & Höne, O. (2014). Online demonstrators and laboratories: State-of-the-art and future developments. Proceedings of EDMEDIA 2014–World Conference on Educational Media and Technology, 547–556.

Chen, C. M., Liaw, S. S., & Chen, I. Y. L. (2014). Developing a virtual teacher as a learning companion to improve learners' learning experience. Educational Technology & Society, 17(4), 107-118.

Creswell, J. W., & Poth, C. N. (2017). Qualitative inquiry and research design: Choosing among five approaches. Sage Publications.

Fontana, A., & Frey, J. H. (2019). Interviewing: The art of science. Handbook of Research Methods in Health Social Sciences, 1-17.

Han, Y. (2018). Animated interface design for learning management systems: Exploration of cognitive load and learning performance. Interactive Learning Environments, 26(5), 679-695.

Kirschner, P. A., & van Merriënboer, J. J. (2013). Do learners really know best? Urban legends in education. Educational Psychologist, 48(3), 1-15.

Liu, X., & Zhou, M. (2019). Supporting online learners through instructor support: A systematic review. Online Learning Journal, 23(1), 117-138.

Maor, D. (2012). The teacher's role in developing interaction and reflection in an online learning community. Journal of Educational Technology & Society, 15(1), 78-88.

von Stumm, M., Hell, B., & Chamorro-Premuzic, T. (2011). The hungry mind: Intellectual curiosity is the third pillar of academic performance. Perspectives on Psychological Science, 6(6), 574-588.

Wang, Y., & Li, H. (2019). Exploring the influence of interaction on student satisfaction and perceived learning in online learnig environments: An empirical study in China. Computers & Education.

Appendix 1

Interview Guide

The purpose of this study was to investigate the effectiveness of animated characters as online demonstrators in enhancing the learning experience of University of Botswana students. The research aimed to assess how animated characters influence student engagement, interest, and understanding of course material, as well as identify any technical challenges and resource constraints associated with their use. By evaluating the impact of animated characters on clarity of instruction and student preferences, the study sought to provide insights into their potential benefits and limitations in online learning environments.

1. Enhanced Engagement

Visual Appeal

Question: "How do animated characters impact your attention and engagement during online courses? Can you describe any specific features that make them visually appealing?"

Increased Interest

Question: "Have animated characters increased your curiosity and interest in the course material? How do they affect your approach to learning?"

2. Clarity of Instruction
Concept Clarification
Question: "In what ways do animated characters help clarify complex concepts or ideas? Can you provide examples of how they make learning easier?"
Step-by-Step Guidance
Question: "How do animated characters assist you in following the course content? Do they provide helpful step-by-step guidance?"

3. Technological Challenges
Technical Glitches
Question: "What technical issues have you encountered with animated characters, such as freezing or lagging? How do these issues impact your learning experience?"
Device Compatibility Issues
Question: "Have you faced any device compatibility issues when using animated characters? How do these issues affect your access and interaction with the content?"
4. Student Preferences

Varied Responses
Question: "What are your overall thoughts on the use of animated characters in your courses? Do you prefer them over other instructional methods or vice versa?"

5. Technical Challenges
Software and Hardware Issues:
Question: "Can you describe any technical problems you've encountered while using animated characters in your online courses, such as software crashes or compatibility issues with your device?"
Follow-up: "How do these issues affect your learning experience and engagement with the course material?"
Bandwidth Limitations:
Question: "Have you experienced any issues related to internet bandwidth when using animated characters? How do these issues impact your ability to interact with the content?"
Follow-up: "What specific problems do you face, such as buffering or slow performance?"

6. Pedagogical Challenges
Alignment with Learning Objectives:
Question: "Do you feel that the animated characters align well with the learning objectives of your courses? Can you provide examples where they either supported or distracted from the educational goals?"
Follow-up: "In what ways could the integration of animated characters be improved to better support your learning?"

7. Diverse Learning Styles:

Question: "How do animated characters cater to your personal learning style? Do you find them effective compared to other instructional methods?"
Follow-up: "What challenges have you faced in adapting to animated characters if they don't align with your learning preferences?"

8. Engagements and Distraction
Engagement Benefits:
Question: "How do animated characters affect your engagement during online lessons? Are there specific features that help keep you interested?"
Follow-up: "Have there been instances where animated characters were more distracting than engaging?"
Attention Span:
Question: "Do you find it challenging to maintain your attention during longer sessions when animated characters are used? How does their presence impact your focus over extended periods?"
Follow-up: "What strategies, if any, have you found helpful in maintaining your attention despite these challenges?"

9. **Resource Constraints**
Cost Considerations:
Question: "Are you aware of any challenges related to the cost of developing and maintaining animated characters in your courses? How do you think these financial constraints affect the quality and availability of such resources?"
Follow-up: "How would you suggest institutions manage or mitigate these costs while still providing valuable learning tools?"
Technical Support:
Question: "How would you rate the availability and effectiveness of technical support for issues related to animated characters? Can you describe any specific experiences where technical support was either helpful or lacking?"
Follow-up: "What improvements would you suggest for technical support to enhance your experience with animated characters?"