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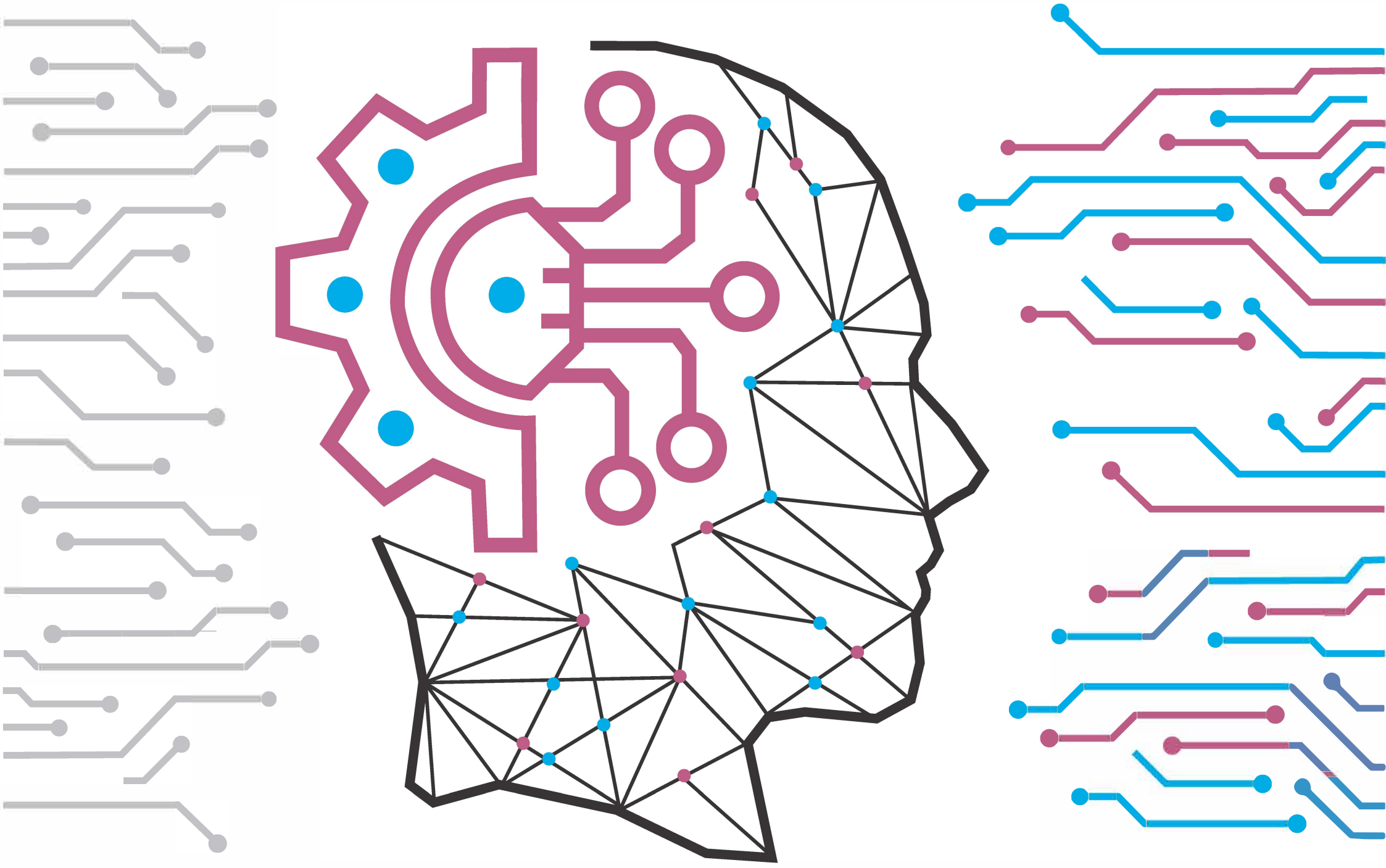

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THE RELATIONSHIP BETWEEN SCREEN SIZE, PERSONALITY TYPE, AND INTRINSIC MOTIVATION IN IR 4.0 GAME-BASED LEARNING FOR MILLENNIAL STUDENTS

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ABSTRACT

The growing popularity of video games has sparked interest among scholars to investigate various aspects of gaming, including player motivation. Well-designed game-based learning may enhance students' intrinsic motivation and thus improve their learning performance. However, the current design of game-based learning did not consider the relationship between screen size effect and personality traits, the knowledge that is essential to ensure implementations that will not disengage part of the students. While multiple screen sizes have been found to influence gamers' perspectives, few studies have explored the effects of screen size on player motivation. Additionally, as game-based learning gains traction to boost engagement and intrinsic motivation in the classroom, more research is needed to understand how personality types and screen sizes impact learner motivation. This innovation aims to address this gap by investigating the relationship between screen size, personality type, and intrinsic motivation in game-based learning for students. To study gaming behaviour and motivation, this innovation has employed an ethnographically informed methodology and a Simulated Gaming Environment (SGE), which serves as a natural setting for players. The data has been analyzed using both descriptive and inferential statistics, qualitative observational analysis using codes, and validated through stimulated recall interviews. The findings may have significant implications for educators and game developers seeking to optimize the design of game-based learning environments to enhance intrinsic motivation among students with different personality types.

Keyword: Game-based Learning, Intrinsic Motivation, IR 4.0, Simulated Gaming Environment (SGE)

1. INTRODUCTION

The implementation of game-based learning has been proposed as a means of enhancing intrinsic motivation and learning performance among students. However, current game-based learning designs do not account for the relationship between screen size, personality type, and intrinsic motivation, which may disengage some students from the learning process. While previous research has indicated that screen size can influence gamers' perspectives, little is known about how screen size and personality type impact intrinsic motivation in game-based learning for students. Given the

rising popularity of game-based learning in Industry 4.0 (IR 4.0) education, it is essential to investigate factors that influence intrinsic motivation among millennial students. Screen size has been identified as a potential factor that affects user experience and performance in gaming, while personality traits have been shown to impact motivation and engagement in educational contexts. However, few studies have explored the relationship between screen size, personality type, and intrinsic motivation in game-based learning for millennial students. Current game-based learning designs do not account for this relationship, which could hinder student engagement and learning outcomes.

A study by Schmidt, Uhrig, and Reuschel (2020) found that screen size had a small major effect on gaming quality of experience and real-world dissociation scores but did not consider the role of personality type in influencing gamers' experiences. In contrast, Smiderle et al. (2020) investigated the impact of gamification on students' learning, engagement, and behavior based on their personality traits, providing insights into how gamification affects university students' engagement and learning behavior. However, more research is needed to examine the impact of gamification across a wider range of disciplines over a longer period. Another study investigated the impact of screen size on gamers' intrinsic motivation while playing games of a specific genre. Surprisingly, the results showed an inductive and significant difference in motivation and enjoyment levels among gamers of different personality types when playing games on varying screen sizes. However, the study had a research gap in that it did not consider personality type from the outset and did not make game-based learning its primary focus. This innovation aims to address these gaps by investigating the relationship between screen size, personality type, and intrinsic motivation in game-based learning, with the ultimate goal of improving game-based learning design for students. By identifying learners' personality types before data collection, this research seeks to fill a research gap and shed light on how game-based learning can be optimized for individual students.

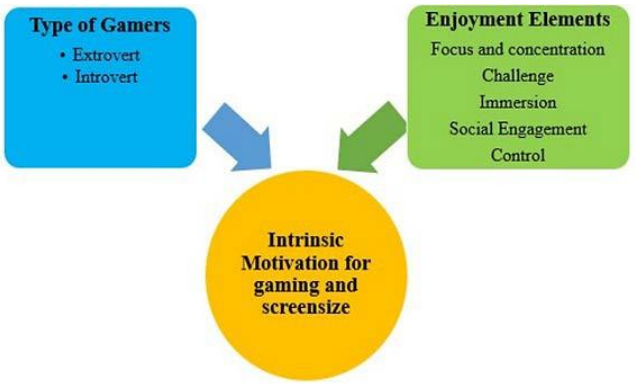

Figure 1 The Relationship between Personality Types of Gamers and Enjoyment Element towards Intrinsic Motivation according to Screen Size

2. METHODOLOGY

2.1 Setting up the Simulated Gaming Environment (SGE)

It begins by designing a simulated gaming environment (See Figure 2). Since this is ethnographic-informed research, it must be conducted in the "natural" setting of gamers and

students. An SGE is the ideal option for ethnographic-informed research for gaming studies and GBL for several reasons such as the "field" of an ethnography study may be adaptable. The natural environment might vary depending on the sort of game, console, and game modes a player decides to use for their research in gaming.

When using a portable device, a gamer can play wherever that is convenient for them, such as in their room, at a friend's house, at the cybercafé, or wherever else they feel most comfortable. The majority of those taking part can be concerned about having their private space video recorded or about having a stranger in their home. Although it might be possible to watch single-player gamers in action, it should be noted that multiplayer games may present greater difficulties because access to another player's home must first be granted. The equipment that is in the scope of this study also might be a challenge. It could be a challenge to find gamers that have the same equipment available in their house.

Figure 2 The 3D Model of the Simulated Gaming Environment (SGE)

2.2 Choosing the Game, Genre, and the Console

For this GBL research, the games selected are Mario Kart and Mario Maker Academy, which offer a platform to explore and experiment with game design theories and principles that can educate and engage players. In addition to playing the game, players are encouraged to participate as level designers to test multiple possible world design elements. Another game chosen is the educational game Big Brain Academy, which assesses the arithmetic and logical thinking of players. The Nintendo Switch console is selected for the study as it can be played on both a small and large screen, providing greater reliability in the data by eliminating factors such as differences in gameplay or controller design. Specific hardware is needed for this research, the Study plans to create an SGE for the participant observation study. Console and Game chosen fit the specific criteria needed in reducing the confounding variables that might influence the result of the study.

2.3. Participant Recruitment (Judgmental /Judgement Sampling or Purposive Sampling)

The researcher has used purposive sampling, also known as judgmental or judgment sampling, in which participants were selected based on the researcher's judgment of their suitability to provide the required information for the study. The study managed to recruit thirty (30) respondents through participant observation and interviews as part of an ethnographic-informed study. The session of testing is 4 to 5 hours of video and audio data has been collected from both single players and multiplayer sessions, respectively. The length, scope, and frequency of time spent in the field are

crucial aspects of data collection for participant observation. Moreover, the sample size of qualitative studies follows the concept of saturation. The study's respondents were UNITEN students aged 18 and above who possess knowledge and skills in playing games.

2.4 Conducting a Myers and Briggs personality test

Once the respondents are identified, the respondents are asked to participate in a personality test to identify their personality type (i.e.- extroverted, or introverted). The participants' observation sessions were conducted separately according to their personality type.

2.5 Participation Observation

Participant observation is a research method where the researcher collects data by observing and participating in the daily activities of the participants. The aim is to gain a comprehensive understanding of social interactions and encourage participants to converse in a more natural environment. In this study, respondents have been asked to play the assigned games at the SGE while being video recorded. As participant observation is employed, the researcher may join the gaming session and ask questions or participate in the session to obtain more input from the respondents. The gaming sessions have comprised both single-player and multiplayer modes.

2.5 Ethnographic Interview

After each session, an ethnographic interview will be conducted. As this is ethnographic research, questions will be non-leading questions, open-ended and unstructured.

2.6 Stimulated Recall Interview (Validation)

Once the data had been analyzed and coded, a stimulated recall interview session was conducted to verify that the observational data had been accurately interpreted. Additional questions were asked during this session to gather further input and confirmation from the participants.

3. FINDINGS

There are two distinctive types of gamers: the extrovert and the introvert. The finding of this study has indicated the effect and the relationship of screen size on extroverted and introverted gamers.

Table 1 The Findings for Extrovert and Introvert Individual

The Types of Gamers	Single Player Session (Respondent/Individual)			Multi Player Session (Respondents/Grouping)			Screen Size Preferences
	X	Y	Z	X	Y	Z	
Extrovert	Excited	Friendly	Expressive	Comfortable with large numbers of audience	Noisy	Full with Interaction	The screen size does not have a big impact on extrovert gamers
Introvert	Prefer darker space	Quite	Very serious	63.83	Calm and Quiet	More reserved	The small screen size does have a big impact on introverted gamers

The size of the screen influences students' learning differently based on their personality characteristics, specifically extroversion and introversion. Introverted students, who prefer personal space and a more solitary environment, are better suited to portable consoles with small screens. These smaller screens offer a personal, intimate learning experience, aligning with their preference for individual focus and minimal social interaction. This tailored approach helps extroverted- and introverted learners engage more effectively with game-based learning tools.

4. CONCLUSION

In conclusion, the I.R 4.0 game-based learning model reveals significant insights into the interplay between screen size, personality type, and intrinsic motivation among millennial students. Our study indicates that screen size notably influences engagement levels, with larger screens enhancing the immersive experience and fostering higher motivation. Additionally, personality types, particularly extraversion and openness, correlate strongly with increased intrinsic motivation when engaging with game-based learning tools. These findings underscore the importance of considering individual learner differences and technological interfaces in designing educational strategies. As educational paradigms continue to evolve, integrating such personalized and technologically adaptive approaches can enhance learning outcomes and motivation among millennial students.

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