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Enhancing Game Usability: A Framework for Small-to-Medium-Sized Game Development Businesses

Akthar, Sayeda Rahnuma

Independent University, Bangladesh (IUB)

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Sayeda Rahnuma Akthar [a][1], Muhammad Rezaul Islam[b][2], Nabila Islam[c][3], Farzana Sadia[d][4], Mahady Hasan[e][5]

[1]*Department of Computer Science, Independent University Bangladesh, Dhaka, Bangladesh*
[2]*Department of Computer Science and Engineering, Independent University Bangladesh, Dhaka, Bangladesh*
[3] *Department of Computer Science and Engineering, Independent University Bangladesh, Dhaka, Bangladesh*
[4]*Faculty of Electronic Engineering & Technology, Universiti Malaysia Perlis (UniMAP), Perlis, MALAYSIA.*
[5]*Department of Computer Science and Engineering, Independent University Bangladesh, Dhaka, Bangladesh*
{2211849,1920091, 1721662}@iub.edu.bd, farzanasadia@studentmail.unimap.edu.my, mahady@iub.edu.bd,

Abstract: The field of Human-Computer Interaction (HCI) research has developed numerous procedures and techniques to ensure high usability when developing software. Usability in video games is also considered to be important, so it is crucial to ensure that game systems comply with usability standards. However, research has overlooked software development, specifically the stage of game development. Additionally, large gaming firms and game developers tend to keep their procedures and techniques secret. Professional reports have revealed the "ugly face" of the gaming industry. Bangladesh's slowly expanding game development sector comprises a significant number of small-to-medium-sized businesses and start-ups. These businesses require practical, developer-centric solutions to guarantee usability as they may lack the funds to engage usability specialists to oversee it. This article discusses the concept of game usability, including current research on usability techniques for game production. The literature included in this study had to meet the following requirements: (1) focused on gaming applications, including websites, PC software, smartphone, and tablet applications; (2) provided information about the usability of the application; and (3) provided experimental evidence of usability testing. The study involved conducting polls, heuristic scoring studies, and speaking with several game developers. Twelve usability heuristics were created based on the Nielsen usability technique and the stages of game software development, which help in preventing typical usability problems in games. A preliminary analysis of the heuristics indicates that they can assist in identifying game-specific usability problems that may otherwise go unnoticed.

1 INTRODUCTION

Video games are interactive electronic games that require a user interface or input device such as a joystick, controller, keyboard, or motion sensing device to generate visual feedback. This feedback is displayed on a video display device such as a TV, monitor, touch screen, or virtual reality headset.

Some video games, such as text-based adventures and computer chess, can be played without a visible display using teletype printers. Audio feedback through speakers or headphones is a common addition to video games, and haptic technologies are also occasionally used. Video games can be categorized based on their platform as arcade, console, or personal computer (PC) games. The gaming industry has expanded in recent years to

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[1] https://orcid.org/0009-0009-6049-8182

[2] https://orcid.org/0009-0004-5721-0276

[3] https://orcid.org/0009-0000-2117-8578

[4] https://orcid.org/0009-0005-1895-1044

[5] https://orcid.org/0000-0002-9037-0181

include mobile gaming through smartphones and tablet computers, virtual and augmented reality systems, and remote cloud gaming. Games can also be categorized into different genres based on their gameplay and objectives.

The video game industry has experienced significant growth in recent years, with revenues projected to reach $197 billion in 2022. The global video game market was estimated to be worth $195.65 billion in 2021 and is predicted to rise to $220.79 billion in 2022. Bangladesh's gaming market was valued at $0.37 billion in 2021, but it is expected to grow four-fold by 2026. India currently leads the South Asian region with a gaming industry value of almost $4.46 billion. Despite the potential for growth in the video game development sector, Bangladesh has yet to fully capitalize on the industry's potential. There are no official statistics on the number of game development companies in Bangladesh. Moreover, game development processes, including software engineering, have been neglected by researchers. Additionally, game developers and large gaming companies tend to keep their processes and methodologies secret, and studies and professional reports have exposed some of the negative aspects of the industry (Islam, 2020).

During the COVID-19 pandemic, many games released were criticized for having bugs or being unoriginal. However, despite these issues, major gaming companies saw an increase in their stock values. The popular gaming platform Steam experienced a surge in its active user base, with an increase of over 20%. (Şener, Yalcin & Gulseven, 2021).

This study aims to investigate whether game developers in Bangladesh utilize the usability evaluation heuristics proposed in various research papers. Video game design focuses on entertaining and engaging the player, which involves various design elements such as storyline, pacing, level of difficulty, and gameplay mechanics. However, since most games require frequent interaction from the player, game designers need to consider usability issues carefully. If game interfaces are poorly designed, they can impede the primary objective of providing an engaging experience to players, resulting in reduced success and quality of the game (Fabricatore, 2007).

The goal of this study is to review the concept of game usability and provide practical, developer-centric solutions to ensure high usability in game development, particularly for small-to-medium-sized businesses and start-ups in the slowly expanding game development sector in Bangladesh. This study also aims to review current research on usability techniques for game production, create usability heuristics based on the Nielsen usability technique and the stages of game software development, and evaluate their effectiveness in identifying game-specific usability problems.

The primary contributions of this paper are:

1. Identify real world usability problems that provide breadth and depth coverage of the game design space

2. To make the heuristics simple enough for individuals with familiarity with usability principles and some game development experience to implement.

3. Game developers to be able to use the heuristics to identify real problems that will affect the usability of games

2 LITERATURE REVIEW

An extensive literature review was conducted on related publications in the field, and an analysis of the most relevant papers have been included below:

Mylly et al., designed a new set of usable usability heuristics that can be used as a practical, developer-oriented tool during the game development process based on user satisfaction and convenience (Mylly, Rajanen, & Iivari, 2020). Politowski et al., presented insights and considerations gathered from developers and literature studies, which may serve as a source of knowledge as well as characterization of the Brazilian game developer's main contributions (Politowski, Vargas, Fontoura, & Foletto, 2016). Zaidi et al., designed a usability framework for VR casual game development for non-gamers that would help developers get important game elements in the pre-production phase, which was tested for user-experience, with positive results suggesting that the framework proposed was successful in producing an immersive VR game prototype for the target users (Zaidi, Duthie, Carr & Maksoud, 2018).

Simor et al., proposed usability evaluation methods for gesture-based games, with a focus on devices with motion-sensing capability such as Kinect and Wii. The study concludes that there is a need for a standardized evaluation protocol for gesture-based serious games, particularly for older adults, to enhance user comfort, welfare, and

confidence (Simor, Brum, Schmidt & Rieder, 2016). Fatta et al., discusses the development of a model for measuring usability evaluation specifically for Mobile Game-Based Learning (m-GBL) applications and highlights the need for a specific model to evaluate m-GBL usability and identifies potential areas for further research (Fatta, Maksom & Zakaria, 2018). Soomro et al., highlights the need to improve the efficiency of conducting heuristic evaluations for application software and games by automating the process and designed a playability heuristic evaluation system (PHES) and tested to identify playability problems in games. The results suggest that using PHES can improve the identification of playability problems within a shorter timeframe compared to manual evaluations (Soomro, Ahmad & Sulaiman, 2014).

Desurvire et al., discussed how adapting efficacious heuristics from productivity software to games, based on popular game review website ratings by gamers, can help improve game quality through design evaluation and self-report surveys. (Desurvure & Wiberg, 2009). Fernandez et al. propose a usability inspection method for model-driven video game development, based on ISO/IEC 25010, to identify and improve usability issues early in development for higher quality, more enjoyable games. (Fernandez, Insfran, Abrahão, Carsi & Montero, 2012). Smith et al. propose VR PLAY, a domain-specific heuristic list for virtual-reality game development, by evaluating Elder Scrolls: Skyrim VR and identifying missing usability principles, highlighting the importance of domain-specific heuristics for evaluating game usability (Smith, Granados & Suss, 2019).

Parker et al. explore how indie game developers perceive the benefits and risks of game streaming, and how it impacts game-making practices, based on interviews with small commercial indie game developers in Toronto and Montreal, finding that streaming offers organic playtesting but has a normative effect on game design (Parker & Perks, 2021). Xenos et al. found that the perceived usability of a game, using Civilization IV as a paradigm, significantly impacts learning during gameplay, suggesting that improving game usability can enhance their educational potential (Xenos, Papaloukas & Kostaras, 2019). Hussain et al. conducted a systematic review of 21 studies on mobile game usability evaluations, finding that a combination of expert review and playtesting methods after completion of the application's implementation was the most popular and effective approach (Hussain, Abbas, Abdulwaheed, Mohammed & Abdulhussein, 2015).

Muhanna et al. developed a list of adapted usability heuristics based on Nielsen's list and game usability principles for evaluating Arabic mobile games, concluding that these heuristics provide an effective and efficient evaluation method for improving the user experience of Arabic-speaking players (Muhanna, Masoud & Qusef, 2022). Şener et al. reviewed research papers and analysed Steam user numbers and stock prices of major game companies to investigate the impact of the Covid-19 pandemic on the game industry, finding that the surge in demand for video games during the pandemic led to increased stock prices of game companies (Şener & Yalçın).Senap et al., proposed a set of evaluation components for assessing the usability of mobile educational games, based on a literature review of heuristics for evaluating the usability of mobile games and educational games, aiming to help developers ensure effective delivery of educational content and a positive user experience (Senap & Ibrahim, 2019).

Vieira et al. proposed a methodology to identify heuristics applicable for evaluating the usability of educational games and found GUESS as a useful heuristic, contributing to the research on usability of educational games (Vieira, Silveira & Martins, 2019). Halonen et al. propose a set of heuristics to evaluate the usability of games that employ speech recognition, aiming to promote effective and successful implementation of speech recognition in gaming (Halonen, Hyrunsalmi, Kimppa, Knuutila, Smed & Hakonen, 2012). Pyae et al., evaluated the usability and user-friendliness of a Finnish skiing video game among 24 elderly Japanese participants, and found that the game was well-received and met the objective of serving as an exercise tool. (Pyae, Liukkonen, Saarenpää, Luimula, Granholm & Smed, 2016).

3 METHODOLOGIES

This paper aims to examine the state of development in usability and related issues in the context of game development in Bangladesh. Three research questions were raised to further specify the research.

1.RQ1. What is the nature of specific usability recommendations for Game Development?

2.RQ2.What Heuristic Method developers follow to develop a game?

3.RQ3. What are the most common problems faced by game developers in each process type?

The above questions influenced the key literature search criteria. The literature search was carried out between September 2022 and December 2023 in five databases: Web of Science, Scopus, IEEE Xplore, ScienceDirect, and ACM Digital Library. The relevant papers were identified by searching in papers' metadata (title, abstract, keywords), using keyword search queries. The keywords identified from the research questions were as follows: Video games, gaming industry, Bangladesh, small-to-medium-sized businesses, start-ups, developer-centric solutions, usability specialists, game production, game developers, usability heuristics, Nielsen usability technique, stages of game software development, typical usability problems, game-specific usability problems.

Renowned works related to game development and video game heuristic evaluations were prioritised from researchers of various countries. Research works related to the same topic from Bangladesh were also searched but nothing remarkable was found. There is not enough research done in Bangladesh about game development. Many other countries have done intense research on this topic. As an alternative measure, articles released by local news media and interviews or data provided by Bangladesh ICT Ministry were studied.

This research is done based on the heuristics provided by Sami Mylly et al. In their research paper The Quest for Usable Usability Heuristics for Game Developers in 2020. Also, theoretical concept was drawn from Kristina Magylaite et al's "Towards High Usability in Gamified Systems: A Systematic" in 2022 which is based on Nielsen's 10 heuristics. Review of Key Concepts and Approaches.

The most frequently used method for usability inspection is heuristic evaluation. However, recent research has demonstrated that heuristic evaluation is not commonly employed as a usability evaluation technique in the video game industry. Game developers prefer to devise their own usability heuristic lists tailored to each game rather than using pre-existing lists since they consider them to be too intricate to use (Mylly, Rajanen, & Iivari, 2020). The authors recognized the need for heuristics evaluation methods specifically tailored to game development. While Nielsen's usability evaluation heuristics are widely used for assessing software systems, they are not always suitable for video games. Therefore, the authors aimed to develop a set of heuristics that could be applied throughout all stages of video game development.

Questionnaires were designed based on the heuristics proposed by Mylly et al. The game development process was divided into eight stages, including Concept, Pre-production, Prototype, Production, Alpha, Beta, Gold, and Post-release, and a total of 30 questions were asked across all stages. The participants were selected randomly from game developers in Bangladesh, including both employees and freelancers. Participation in the survey was voluntary, and anonymity was maintained. The survey questions were distributed among the participants through a Google survey form link.

Additionally, interviews were conducted with the participants to gain further understanding of the game developing situation of Bangladesh. In this interview participants were asked to explain their struggles and hardships in the various stages of game development and as game developers.

4.1 DATA ANALYSIS & RESULT

In October 2022, a small-scale survey was conducted among game creators, testers, consumers, and freelancers in Bangladesh to gauge their views on game usability, the use of heuristic evaluation in businesses, and the usefulness of usability heuristics described in the literature. The survey received responses from 19 individuals. In addition, interviews were conducted with a few game testers and developers who were both employees and independent contractors. Despite the relatively small number of game firms in Bangladesh, only 36% of the developers responded to the survey.

The research on game development in Bangladesh is inadequate compared to numerous other countries that have conducted extensive research on the subject. Nonetheless, with the assistance of publications from other countries, the researchers were able to conduct their study. Six papers were selected as qualified for analysis, and the years and categories of the publications were examined. The results indicate that the chosen papers

were published within the past five years, but the number of papers was small. Most of the articles were conference proceedings.

4.2 Usability testing Method employed.

The papers that were chosen used a variety of usability assessment techniques. The Quantitative and Qualitative approaches used in this paper are (1) Questionnaires (n=20); (2) "Think Aloud procedure"; (3) Interviews (n=10); and (4) Heuristic Testing (n=8).

The response from the respondents to an inquiry about what usability meant to them is quite like how people think of (game) usability: "Usability is one of the design goals that should be pursued during development to make the product as accessible, intuitive, and transparent as necessary to its core audience." This encourages the inclusion of usability activities in the development cycle.

To discover more about the input that consumers have gotten by speaking with various gamers and non-gamers. Another response highlights providing players with space to comprehend the game and the option to modify that. How easily a player can use and interact with a team is referred to as its usability. Poor usability is typically a result of poor user experience (UX) design, a lack of customization options for players to tailor the game to how they want to enjoy it (for instance, relocating controllers to suit left- and right-handedness), and a lack of instructional areas for new players.

There are several ways for the game development process to resemble the traditional software development process. the basic game development process can be divided into following phases:
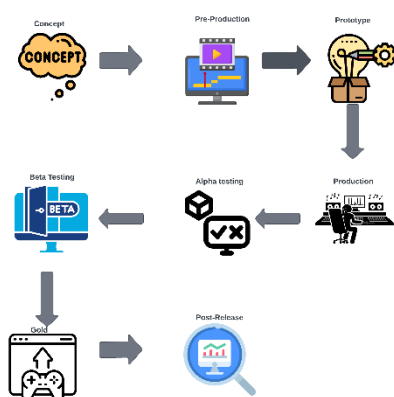

Figure 1: Development Phases. It shows Phases list & Details about the development phases. (Mylly, Rajanen, & Iivari, 2020)

This study goal was to prepare a new set of heuristics in some phases to understand the process more smoothly.

4.3   DESIGN OF Questionnaires

Based on Eight development phases which are discussed above, the study is designed with some Questionnaires to proceed in this research. In Table: 2 some of the most important questions are given below:

- During the concept development stage do you gather all the necessary information and set them on board?
- When designing the game, do you consider the target audience?
- Rate the complexity and difficulty of the AI you use in the game?
- For casual online or offline games do you allow players to exit/quit anytime without harsh penalty or losing in-game progress?
- Do you make the basic controls and tutorials easy to learn for new players?
- Do you provide both simple and complex control options in your game to cater to the needs of both inexperienced and experienced players?
- At beta phase of the development do you ensure the players receive enough feedback from their surroundings while progressing through the
- Do you ensure the game interface/HUD (skill bar, health indicator, mini-map, compasses, currency) is informative?
- Do the players have to wait to download a massive update package and install to play the game?
- Do you provide manuals, tutorials so the player doesn't have to rely on outside sources for information?
- Does the new content remain consistent with the old content/base game?

4.4   Participants in the usability testing

Most of the studies (64%, n = 10) had only one type of user as a participant in usability evaluations, e.g., Freelancer or Game Developer (30%) professionals only. By categorising the data according to the number of participants according to type of usability evaluation method.

4.5 Data Extraction and Categorization

Data extracted from each article were recorded on a computer worksheet (Excel) to categorise and compare characteristics.

4.6 Data Analysis

The dataset was calculated using Excel Sheets and performed quantitative analysis and calculated descriptive statistics, consisting mostly of frequency tables for the categorical variables. The study summarised the findings from the selected articles to answer the research questions that guided this study. Cross tabulations were used to make filter results from the survey questionnaires. In Figure 2, Visual mapping is shown for this online survey.
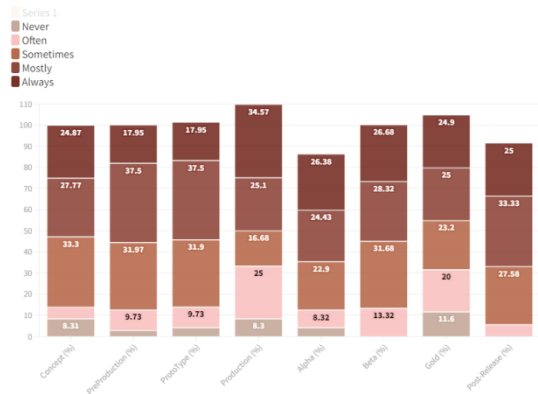

Figure 2: Survey Result Based on Questionnaires

In the above figure, this graph shows the mapping of data collected from game developers based on their experience using different parameters of their development phases.

Here, the result is longitudinal. The actual results can be increased or decreased in a sequential manner depending on the variable (No of Participants).

Table 1: This Crossed tabulation shows calculations of survey questionnaires using development phases maintaining heuristics.

Development phases / parameters	Never	Often	Sometimes	Mostly	Always
Concept (%)	8.31%	5.53%	33.30%	27.77	24.87%
PreProduction (%)	2.77	9.73	31.97	37.5	17.95
ProtoType (%)	4.15	9.73	31.9	37.5	17.95
Production (%)	8.3	25	16.68	25.1	34.574
Alpha (%)	4.15	8.32	22.9	24.43	26.38
Beta (%)	0	13.32	31.68	28.32	26.68
Gold (%)	11.6	20	23.2	25	24.9
Post-Release (%)	0	5.53	27.58	33.33	25

The research is to ensure if any of the answers depends on or correlated with each other because of the usability testing, as the correlation approach is cited as an important component of game development. To have a clearer understanding of this study, if a developer failed to build a clear concept or prototype of the game, the game development can be stuck and further failed to proceed.

4.7 Comparison of Two Heuristic Models

In 2022 Magylaitė et al., introduced another set of Heuristics for game development.

To gain a better understanding of the nature of the recommendations proposed in the selected papers, the generalised recommendations namely: **Nielsen's heuristics for user interface design.** Heuristics serve as the most general usability principles available. There are several similarities between in this reviewed heuristics and Nielsen's heuristics; N1, N4, N5, and N9 are kind of similar with the concepts so far. The discussions were with the developers but there are some variations with their version of heuristic methods.

For instance, Nielsen`s consistency and the standard 'heuristic' is that 'users don't have to Do different words mean situations and actions. The platform rules. Heuristics dealing with consistency, "provide consistently Reacting to User Actions", and basic Mechanics such as hit detection, game physics, and characters Movement and hostilities should be appropriate about the user's situation. Games should provide consistent input mappings to match user

actions. These situations are also defined by the phases Concept, Pre-Production, prototyping.

Nielsen's error detection (N9) (N5) is like alpha and beta phase as Alpha and Beta testing is the user end's acceptance testing. This can help to detect bug from the final product and fix it if needed. The data is shown here Table 2, here the similarities between two methods are denoted by ✓.

Table 2: Similarities between Two Methods

	Concept	Preproduction	Prototype	Production	Alpha	Beta	Gold	Post Release
N1	✓	✓	✓	✓		✓		✓
N2								
N3								
N4	✓	✓	✓	✓				
N5					✓	✓	✓	✓
N6								
N7								
N8								
N9		✓		✓	✓		✓	✓
N10								

This also addresses control design, artificial intelligence, and information on game status. However, the content and focus of the heuristics are significantly different. Their heuristics focus on engagement issues, but ours are strongly oriented around usability and are augmented by detailed information on common usability problems.

4.7. Proposed Heuristics

To fulfil two key functions in the game design process, this study put together a set of game heuristics. First, heuristics can be utilised as a set of design guidelines early in the game design and development process. They can also be used to conduct usability inspections, where evaluators utilise them to iteratively critique the design.

This paper's approach is more closely aligned with that described by Sami Mylly et al., who suggest that heuristics can be developed using specific software development phases, as well as by developing principles that describe the usability problems that seem to be present in games. Nielsen's method for defining a new set of general-purpose heuristics served as the initial motivation for this method for defining game usability heuristics.

After studying both methods, a set of heuristics was designed to help game developers in Bangladesh. Here are the key findings of the analysis; –
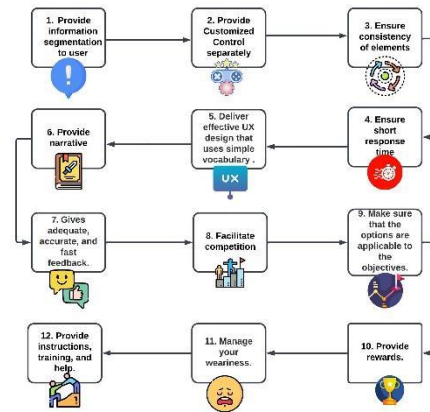

Figure 3: Twelve Proposed Heuristics.

Here each heuristic is listed above described and explained how common problems can be avoided. (1) prior to reaching them, long-term goals should be visible, whereas short-term goals should be obvious from the start. (2) There are several types of players; for example, some are right-handed while others are left-handed, and some might only have one hand or be subject to other limitations. The player should have the option to change the controls to play the game as effectively as feasible. (3) Ensuring that the system-wide use of the same coloration provides high quality (such as a raised rectangle), word, command, etc. (4) it is to make sure there are no unwelcome lags or delays in the system's response to user input. (5) The visual representations that are frequently used to convey information about the game's current condition include radar views, maps, symbols, and avatars and use of jargon that pertains to a specific topic and ought to be familiar to regular users.(6) Adding a fictional plot to a tale will boost user interest and concerns the user's subjective emotional enjoyment, which is often assessed through user testing, and is greatly influenced by the way the game creation process is structured.(7) Gamers must be aware of their progress toward the game's objective. Feedback on their development will encourage them to keep playing (progressive feedback), and input on their present and future circumstances will make it much apparent how to move forward (informative feedback). (8) It is worthwhile to overcome the challenges since doing so makes you feel good. Even though the trials could be challenging, if the players succeed, they will keep trying. It fosters a thorough user ranking and incentive system in a gaming solution. (9) Ensuring that the activities that system users can do at any given time are in line with the

usual steps of the activity that is being performed and that no distracting, deceptive, or irrelevant options are shown, or that they are easily identifiable. (10) Users receive badges, which can be physical or digital, for a variety of honourable deeds or accomplishments. (11) Giving system users the ability to control the system's speed and not imposing arbitrary, fixed time limits on user operations. (12) The complexity and learning curves of many games make it difficult for players to become proficient in the fundamentals of the game. Users should have access to comprehensive game documentation that explains how to interact with game features and understand visual cues.

Each assessor filled out an open-ended questionnaire at the end of the trial. Questions were asked participants to describe the advantages and disadvantages of using heuristics to evaluate games. Also Interviews were taken about any heuristics that they found particularly helpful and whether or not they were challenging to use. Finally, it is learned if they discovered problems using the heuristics that they would have ignored in any scenario.The problem description was examined.Some deleted problems that by the same evaluator brought up frequently as well as problems that did not adequately depict actual usability problems (such as comments regarding game play, preferred features, etc.). The research confirmed that the evaluators referred to heuristics that were pertinent to the noted problems.

5 Discussion

The results of the review presented above served as the input answering the research question RQ1-RQ3. The key observation is presented below:

RQ1. What is the nature of specific usability recommendations for Game Development?

The authors of the chosen papers presented their findings not just as advice for usability but also as suggestions for enhancing user experience, increasing motivation, and improving compliance with humans.

Many of the suggestions fell under the category of being widely accepted, such as using common jargon, giving helpful comments, preventing errors, segmenting information, assuring quick response times, etc. As an alternative, the writers frequently suggested employing modality and signalling principles, making sure that all necessary information was provided prior to the activity, and including

features for managing fatigue (adaptable time limitations and speed of work). While not all software systems fall within these standards, it is obvious that they should be considered when creating games. (Magylaitė, Kapočius, Butleris & Čeponienė, 2022).

RQ2. What Heuristic Method developers follow to develop a game?

Most game developers attempt to create games using Nielsen's heuristics method. The survey asked if it would be simple or difficult to implement a particular heuristic in a current project.

However, some recent studies have alarmingly shown that heuristic evaluation is not a typical usability evaluation method in the video game industry and that game developers would prefer to create their own usability heuristic lists for each of their games rather than use existing lists, which they believe to be too cumbersome to use. So, there is a need to better comprehend the developer's perspective on game usability. Developers attempt to follow a sound model before implementing it, but for complex use cases of AI (Artificial Intelligence), they construct their own strategies to proceed.

Together with "Greater knowledge," it is believed there is a need for a broader set of heuristics that covers the entire spectrum of game creation, from concept to live operations and serving the user base, as well as a set that explains what and why the heuristics are. These questions are being addressed by the heuristics suggested in this study, which also serves as a foundation for a more in-depth and comprehensive treatment of game creation. (Mylly, Rajanen, & Iivari, 2020)

RQ3. What are the most common problems faced by game developers in each process type?

Age is a crucial consideration when deciding how to create or enhance games, as shown by most of the papers that were chosen, which (30% and 30%, respectively), discussed the usability of games especially geared at either children or adults. Half of the six publications that offered suggestions for adults were targeted exclusively at gamers over the age of sixty. The authors of the remaining 40% of the chosen publications didn't mention any details about the target population that their recommendations were intended for. Other user qualities, such as user goals, degree of motivation, education, or IT abilities, were also cited as factors that frequently have an impact on usability-related system development decisions (Magylaitė, Kapočius, Butleris & Čeponienė, 2022).

This strategy is more in line with the idea that heuristics may be created for software categories by analysing current products and creating rules that define the usability issues that are discovered. Yet, it was impractical to conduct the evaluations ourselves due to the vast range in game usability issues that anticipated. This research anticipated that both within games and between game genres, there would be a large variety in usability issues. The study has consequences for both theory and practice.

It was found that the recommendation lists offered by the various authors largely overlapped after assessing the pertinent guidelines and recommendations for gamified systems discussed in the chosen articles. The only thing that varied between the many authors' mentions of the same idea or advice was the wording. Hence, an initial categorization was done to make the study of the recommendations easier. To go forward, game developers set their own usability assessments rather than always using the standard heuristic approach. Instead of always using heuristics, game creators create their own usability tests to move the process along. Through speaking with or surveying game creators, this study concluded that each one upholds the industry standard for game production in their own unique style.

This paper first reveals the degree of success of the heuristics in achieving these objectives. With only a handful of the heuristics, people were able to track down countless problems and discover numerous problems. The evaluation does not include a thorough analysis of the heuristics because it is not expected for any game to necessarily have problems in every area of coverage. But it does show that the evaluators were able to understand the heuristics, and a check at the problem descriptions shows that they did match the range of coverage specified by the selected heuristic. This shows that people could apply the heuristics to recognize real problems, and that they weren't too challenging to utilise.

For a full evaluation of the heuristics, more testing with multiple evaluators and where the heuristics are applied to games from different genres will be necessary. However, it is assumed that the results give us enough proof to say that heuristics are effective in spotting important usability problems in the context of games.

6 LIMITATIONS

The data collected for this paper ran into a few bumps. Secondly, Bangladesh has done significantly less research and work on game development than other countries. Because there are so few game production companies, there are incredibly few game developers. On this subject, neither formal education nor research exist. Most developers are self-taught independent contractors who pick this line of work out of curiosity and passion. Young pupils receive no assistance from the government. Most of them begin their careers as independent game creators. Independent contractors make up the bulk of participants. Most company developers are reluctant to share information because of corporate policies. Most game creators do not want to take part in the interview because they are so private. This is a pattern that was also observed in other papers (Mylly, Rajanen, & Iivari, 2020). They were reluctant to disclose the information.

7 CONCLUSIONS

In this study essay, the usability of game development is the main topic. One of the biggest segments of the entertainment market is gaming, which is expected to have 3 billion users and a market value of US$197 billion by 2022. With a few ardent video game creation businesses, Bangladesh has gradually entered the gaming industry. The game development process should find it easier to follow accepted software development procedures if heuristics are maintained. Games may be created using these process models. Nielsen's heuristics aid consumers' cognitive load, especially their memory power. Because it's easier for them, it's essential to think about how to emphasise opportunities and useful attributes.

With the use of heuristics, there are some sets proposed in this research, which present a fresh method to modifying usability inspections for games, allowing developers to assess both mock-ups and functioning prototypes. In this study, usability problems in software were found and a set of design principles for game creation were presented. This broad methodology, which is a novel approach, can be used by researchers to understand design problems in different kinds of speciality software. This study points that this method can be applied to further development studies and that it can be used to create new heuristics on involvement and for multiplayer games in Bangladesh.

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