

**DIU MCT UNDERGRADUATES' REFLECTION ON THE
PREFERENCE OF 3D MODELING SOFTWARE FOR MOBILE
GAME DEVELOPMENT**

BY

**SUMYA EASMIN KANTA
ID: 203-40-725**

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Multimedia and Creative Technology

Supervised By

Apurba Ghosh
Assistant Professor
Department of MCT
Daffodil International University



**DAFFODIL INTERNATIONAL UNIVERSITY
DHAKA, BANGLADESH**

APPROVAL

This Project titled “DIU MCT undergraduates’ reflection on the preference of 3D Modeling software for Mobile Game Development”, submitted by Sumya Easmin Kanta to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 11 January 2025.

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Faculty of Science & Information Technology
Daffodil International University

Internal Examiner

Suman Paul
Senior Graphic Designer
ATN NEWS

External Examiner

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We hereby declare that, this project has been done by us under the supervision of **Apurba Ghosh, Assistant Professor, Department of MCT** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:

Apurba Ghosh
Assistant Professor
Department of MCT
Daffodil International University

Submitted by:

Sumya Easmin Kanta
ID: 203- 40- 725
Department of MCT
Daffodil International University

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ABSTRACT

The gaming sector is on the rise, and mobile game development plays a significant role in this expansion due to the increasing use of smartphones. The demand for high-quality mobile games underscores the importance of selecting the right 3D modeling software. This selection impacts the efficiency of game development and the quality of the game assets produced. This research investigates the preferred 3D modeling software among undergraduate students in the Multimedia and Creative Technology (MCT) Department at Daffodil International University (DIU) for mobile game development. By utilizing qualitative and quantitative analysis methods, this research aims to identify the most popular software choices, explore the factors influencing these selections, and recommend improvements for training in 3D modeling specifically for mobile game development.

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CHAPTER 1

Introduction

Combining cutting-edge technologies and artistic practices is essential to provide various experiences in mobile game development. With the rapid growth of smartphones and the rising popularity of mobile gaming, this sector has become a vital part of the global entertainment industry. The range of games varies from basic logic puzzles to incredible multiplayer universes, resulting in significant targets and high demand for exceptional visuals and seamless interactivity. This progress dramatically relies on the importance of 3D modeling software in crafting high-quality assets and lifelike environments. Tools such as Autodesk Maya and Blender enhance immersion within these environments. These creative tools connect visionary ideas with technical implementation, fostering innovation among mobile game developers. However, mastering these applications often poses numerous challenges, including complex interfaces and limited training opportunities. The current research explores the preferences and challenges associated with 3D modeling software among undergraduate students in the Department of Multimedia and Creative Technology at Daffodil International University, Bangladesh. This study will also provide valuable insights for educators, industry professionals, and software developers based on the experiences of these students. Ultimately, the findings will illustrate students' tool preferences and the reasons behind their choices. The findings seek to fill the void in training provided in academic settings compared to industry demands, enabling future game development professionals to transition effectively into this highly competitive field.

1.1 Background of Mobile Game Development

Mobile game development has rapidly evolved, driven by swift technological progress and the widespread availability of smartphones and tablets. The mobile gaming sector has moved beyond casual entertainment, expanding its reach to include education, healthcare,

and social impact. Mobile games provide engaging and interactive learning tools, fostering creativity, collaboration, and problem-solving abilities. The emergence of game engines such as Unity3D and Unreal Engine has transformed the development landscape by providing versatile platforms for efficient game creation. These engines enable developers to design immersive worlds, implement realistic physics, and ensure smooth gameplay. Additionally, integrated 3D modeling technology empowers developers to improve visual quality, creating life-like environments and characters that captivate players and enhance the overall user experience.

Moreover, the expansion of mobile gaming has created opportunities for independent developers and students to make significant contributions to the industry. With more readily available tools and resources, anyone with creativity and determination can create games that engage global audiences. Although there is vast potential in mobile game development, challenges persist, particularly for aspiring developers seeking to gain the technical skills and resources required for success.

1.2 Importance of 3D Modeling Software in Game Development

The focus is primarily on designing, animating, and integrating various visual components within a game. 3D modeling software allows developers to produce game assets, such as lifelike characters, props, and settings essential for the gaming experience.

Among the many tools available for 3D modeling, a select few are prominent because of their capabilities and versatility. Typically, features like sculpting, rigging, texturing, and rendering are robust and necessary for both stylized and hyper-realistic graphics in Maya and Blender, in addition to 3ds Max. Indeed, Autodesk Maya comes equipped with a sophisticated animation and rigging interface. Meanwhile, Blender retains its accessibility, making it readily available for all developers. Despite their advantages, mastering 3D modeling software requires considerable effort due to challenging learning

curves and complex interfaces. Additionally, cost, licensing policies, and resource management will significantly impact the process of selecting and adopting these tools. A student or novice developer must grasp these factors to consider making knowledgeable choices that align with their objectives and aspirations.

1.3 Overview of Research Focus

This research study identifies the preferences, challenges, and requirements of undergraduate students majoring in multimedia and creative technology at Daffodil International University, Bangladesh. Additionally, it aims to determine the following:

The top three 3D modeling software applications preferred by DIU students for the development of mobile games.

The elements that have influenced their software choice include technical capabilities, user-friendliness, and availability.

Students face obstacles to learning and utilizing these tools, such as insufficient professional education and the complexity of software interfaces.

The anticipated findings of this research will offer valuable insights to educators, industry stakeholders, and software developers regarding how these students can be more effectively prepared for careers in the field. This study will contribute to a strong ecosystem for mobile game development by synchronizing training programs, curricula, and software functionalities with the goals of aspiring game developers.

1.4 Objectives of the Study

The following objectives guide this study:

1. **Identify the Most Preferred 3D Modeling Software:** This involves analyzing the software choices of DIU MCT students and understanding the reasons behind their preferences, such as Autodesk Maya and Blender.

2. **Evaluate the Factors Influencing Software Preferences:** We will examine how usability, features, cost, and accessibility impact students' decisions and overall satisfaction with various 3D modeling tools.
3. **Investigate the Challenges Faced by Students:** The study will highlight the difficulties students encounter in learning and using 3D modeling software, particularly regarding interface complexity, lack of formal training, and limited resources.
4. **Propose Practical Recommendations:** The study will provide actionable recommendations for educators and industry stakeholders to address gaps in skills, resources, and systematic training.

1.5 Scope and Limitations

The research focuses on the experiences and preferences of DIU undergraduate students in the MCT department regarding 3D modeling software. Quantitative data were gathered from 240 students, which accounts for 20% of the MCT department, regarding their choices, challenges, and aspirations.

Nonetheless, this research faces several limitations:

1. **Sample Size and Representation:** The findings may not capture the complete variation within the broader population of DIU students or the global game development community.
2. **Cultural and Geographical Context:** This study is within DIU in Bangladesh; therefore, its findings might have limited applicability in regions with differing economic and/or cultural circumstances.

3. Self-reported Data: The dependence on self-reported survey data introduces potential biases, including social desirability bias or misinterpreting technical terms.

In spite of these limitations, the research offers a specific viewpoint that is essential for fostering learning initiatives and materials that address the needs of multimedia professionals in Bangladesh.

CHAPTER 2

Literature Review

Regardless of whether it's commercial or open-source, the game engine serves as a crucial foundation in the video game sector, providing numerous tools and features necessary for game implementation. Key factors influencing the selection of a game engine include its compatibility with platforms, the scripting language utilized, and its efficiency in managing computational resources. Each of the prominent game engines, such as Unity3D, Unreal Engine 4, and Panda3D, comes with its own set of distinct advantages and drawbacks. Unity3D is often recognized for its adaptability and extensive asset store, while Unreal Engine 4 has established itself as a top choice for high-quality graphics rendering. Although Panda3D is less widely known, it is favored for educational projects and simpler game development, underscoring the significance of thoughtfully selecting an engine to meet specific project requirements.[1]. Autodesk Inventor is a powerful design package that allows for both 2D and 3D modeling, with specific machinery design and advanced engineering applications. It offers adaptive modeling, easy integration with other CAD packages, and specific tools to handle large assemblies. It has been and will be a trustworthy companion for mechanical engineers and product designers alike [2]. The "Beginning 3D Game Assets Development Pipeline" course is an in-depth project-based tutorial that takes users step-by-step through the complete workflow for developing 3D assets, from conceptual design to integration into Unity. The pipeline employs industry-standard tools, such as Maya for modelling and rigging, and Substance Painter for high-level texturing. The tutorial also covers the procedures for animation, placing of assets, and iterative design techniques that can be very important to the 3D artist who wants to know about the whole process of development [3]. Mobile game development is where technology and creativity meet, creating an interactive entertainment and learning experience. Game-based learning is one of the upcoming

methods that utilize the interactive nature of games to enhance cooperation, critical thinking, and active learning among learners. By employing gamification strategies, GBL provides valuable insights to educators and researchers seeking to foster an immersive learning environment [4]. Advanced 3D modeling tools such as Blender, Autodesk Maya, and 3ds Max are indispensable in mobile game development, enabling developers to create visually appealing and functional assets that enhance user engagement. These tools answer the needs and requirements of digital learners in this modern age by offering the required flexibility and features toward the creation of dynamic game environments and characters [5]. A mobile game development framework, such as Student Personalized Learning, extends user experience by incorporating gamified elements, personalized learning pathways, and interactive interfaces. Although a few challenges remain, like complexity in customization and the costs involved, these frameworks continue to change education and entertainment [6]. The increasing availability of smart mobile devices has led to the rapid development of instructional and entertainment game applications. These applications offer a variety of incentive systems, such as emotional feedback, glory, and access. The diversity of rewards in recreational games is much higher than in instructional games, which signals significant differences in user engagement strategies [7]. Different 3D modeling techniques adopted in assessing the built environment have influenced decision-making processes in architecture and engineering. Integrating CAD into 3D models allows a more precise visual display of intricate designs, hence helping professionals make proper decisions during the planning and construction phases. These models also enhance public consultation through more precise, realistic visualization of designs, giving stakeholders a better idea of the intended proposal. Virtual scenarios and immersive settings can simulate real-world scenarios of how the designs could impact the existing world. It enhances collaboration, reduces errors, and better aligns with the project goals and community needs [8]. Being game developers themselves, indicate an active encouragement for mobile game developers to use software design patterns that could raise software quality and/or make the

process easier and quicker. Design patterns present standard solutions for more efficient and maintainable projects. Most taxonomies stop at smaller-scale patterns, so their guidance to game developers cannot generally be practical. Moreover, most of the frameworks are not capable of fulfilling various development requirements, which further creates a demand for more integrated and flexible tools in the development of mobile games [9]. Game development is an interdisciplinary activity, melding science and art and commerce together in ways that transcend discipline silos. The KCC framework promotes collaboration, thereby preparing students for the realities of professional game development. Emphasizing collaboration and integration across disciplines, the KCC framework positions learners to take on real world challenges and succeed in dynamic, multi-faceted careers in the game industry [10]. 3D modeling is such a powerful combination of technology and artistic creativity that helps to enhance gameplay quality in a big way by enabling realistic and immersive graphics. Virtual reality brings visually stunning game environments and lifelike characters to life. Its applications also go beyond gaming into other fields, such as architecture, engineering, and education, showing their versatility and impact. Here, the most recent innovation, such as integrating deep learning algorithms into 3D modeling, catalyzes a complete automation of complicated processes and raises the bar for productivity. His development enhances realism, streamlines the development workflow, and enables new levels of interactivity and immersion. 3D modeling represents the continuous development of innovation within digital content creation through the amalgamation of technical precision and artistic expression, thus enabling developers to create interactive and dynamic experiences across various industries [11]. It embeds topology, material, and illumination optimization within one process chain, simplifying the traditional multi-stage workflow. It generates real-time 3D triangular meshes compatible with web browsers and mobile devices, thus making it very suitable for challenging applications such as scene modification and material breakdown. These are integrated into one process in this approach, greatly simplifying and accelerating the process of creating and publishing interactive 3D

content. Performance and efficiency enable faster production and, hence, seamless delivery of dynamic 3D experiences, smoothing the workflow in the gaming industry, architecture, and virtual simulations [12]. Novice programmers in creating mobile applications for iOS and Android face key challenges in design, development, and marketing. The passage has shown the importance of agile testing methodologies, which introduce flexibility and user feedback during the development process. It also points out the importance of users in the development process to ensure that the product will meet the audience's needs. Further, it gives strategic recommendations that may assist developers in surviving the competitive mobile game market by providing advice on how to be successful and unique within the market competitive jungle [13]. Using free and open-source tools such as Blender, Unity, and GIMP, students who are novice game developers study 3D game development with practical, project-based learning. This hands-on learning experience reinforces their skills and innovation and helps them realize original ideas for games. Students will create complete games to acquire hands-on experience, preparing them for the industry and equipping them with the necessary skills to thrive in game development [14]. Advancements in 3D modeling technology, such as automated modeling and deep learning, will make games even more realistic and immersive. These are innovations that simplify the most complex processes in order to create realistic environments and characters quickly. While some challenges, like technical limitations or implementation problems, are mentioned, it also gives a very practical solution and a view of how things could be in the future. This continuous evolution points out the potential of 3D modeling to change game design, pushing the boundaries of creativity and interactivity [15]. An introduction to 3D simulation and game development emphasizes using accessible tools like Git for source control, Blender for asset creation, and Unity for game design. It emphasizes the complexity of game production and the need for well-defined projects with a strong design focus. These tools are not only easy to adopt but also sustainable, allowing students to continue using them beyond the classroom. This approach therefore provides learners with

immediately applicable skills in real-world settings of game development [16]. In video game development, it follows a more structured process for creating 3D models and texturing, giving the process an overarching importance. Using Blender, developers create, model, retopologize, and texture 3D assets using poly-by-poly modeling, box modeling, and sculpting methods. There is a heavy focus on using hand-painted textures to achieve stylized, cartoon-like graphics that are entirely usable in mobile games. This approach connects theory and practice by integrating Blender's documentation to practically understand the tools and techniques necessary for practical and creative game development [17]. While 3D modeling technology has continued to improve realism and life-like features on environments and characters in gaming, it has also been utilized for engineering and education purposes in displaying digitalized images of actual objects. It has thus opened many exciting possibilities for highly detailed simulations and interactive experiences. Moreover, continuous efforts are made to overcome present difficulties in 3D modeling and automatic modeling to explore new, innovative applications in instructional programming. This continuous development helps refine the technology, extending its possibilities in more and more application fields [18].

2.1 Overview of 3D Modeling in Game Development

3D modeling has become crucial in modern game development, bridging the gap between artistic creativity and technical precision. It allows developers to create visually captivating characters, environments, and objects seamlessly integrated into the gameplay mechanics.

Progress in 3D modeling technology has enhanced realism and immersion in games by employing sculpting, retopology, and procedural texturing methods. Software like Blender and Autodesk Maya is essential, enabling developers to create highly detailed and dynamic assets. As the gaming sector continues to grow, there is an increasing

need for talented 3D artists and modelers. This demand fuels continuous innovation in 3D modeling technologies, which include real-time rendering, automated modeling, and advanced simulation. These enhancements enable developers to focus on creative storytelling and gameplay while maintaining the technical integrity of their assets.

2.2 Key Features of Popular 3D Modeling Software

For developers, software for 3D modeling is essential as it impacts their efficiency, creativity, and the overall quality of their output. Here are some of the most commonly used tools in the industry:

Autodesk Maya

Maya is a dream for professionals, celebrated for its robust animation and rigging capabilities. It boasts an easy-to-navigate interface along with a wide array of choices. Plugins make it suitable for modeling a variety of assets. UV mapping, advanced simulations, and built-in rendering enhance its appeal for high-end game production.

Blender

Blender is open-source, making it available to independent developers and students. It provides a complete range of modeling, sculpting, texturing, and animation functions, with significant user customization options for the UI. This includes an integrated game engine and real-time rendering features, making it a more budget-friendly alternative to commercial software.

3ds Max

It is preferred for its precision in architectural visualization and modeling game environments. It offers numerous tools for procedural animation, realistic physics simulation, and high-quality rendering.

ZBrush

ZBrush excels in digital sculpting, making it ideal for crafting intricate characters and creatures. It integrates well with other applications like Maya and Blender, ensuring a smooth workflow.

2.3 Previous Studies on Software Preferences

Previous studies have shown that the key factors influencing developers' choices in 3D modeling software are usability, cost, and accessibility. This can be summarized as follows:

- **Adoption Trends:** Autodesk Maya is consistently preferred for professional applications due to its advanced features, whereas students and independent developers favor Blender because of its open-source model and affordability.
- **Challenges:** One research indicated that 18% of participants struggled to navigate software interfaces, and 10.9% faced issues while modeling complex objects. These findings highlight the need for beginner-friendly interfaces and comprehensive tutorials.
- **Absence of Formal Education:** The trend of relying on self-directed learning is prevalent, with 83.3% of individuals in a recent survey indicating they lacked formal training in 3D modeling. This emphasizes the necessity for organized educational programs to address the skill gap.
- **Preferred Creative Roles:** Creative positions, such as 3D artistry and environment design, are sought after by 40% of those aspiring to enter the field. This preference aligns with using tools for creative expression and visual storytelling.

2.4 Gaps in the Existing Literature

While existing literature forms a foundation of knowledge, some areas remain underexplored. For instance:

Targeting Specific Populations:

Most of the literature does not provide comprehensive insights into the preferences and challenges of specific demographics, such as undergraduate students enrolled in multimedia and creative technology programs.

Detailed Exploration of Influencing Elements:

There is little emphasis on understanding the reasons behind the preference for tools like Autodesk Maya or Blender. Important factors include the prioritization of features, pricing, and availability.

Neglect of Developing Regions:

Research typically focuses on developed countries, thereby missing the unique obstacles students and developers encounter in regions such as Bangladesh.

Educational Deficiencies:

Though the absence of formal training is recognized, there is limited discussion on effective teaching methods for introducing beginners to 3D modeling.

Addressing Usability Challenges:

Even though the complexity of interfaces is recognized as an issue, few actionable suggestions exist for enhancing the usability of 3D modeling software.

The study seeks to fill these gaps by concentrating on the distinct needs of DIU MCT undergraduates in Bangladesh. It offers localized insights along with practical recommendations for enhancing tools, training, and resources.

CHAPTER 3

Methodology

The qualitative research method was utilized to obtain insights into the preferences, experiences, and obstacles aspiring multimedia professionals face regarding 3D modeling software in mobile game development. Demographic details, including age, gender, and occupation, were gathered alongside individual preferences for the software, issues faced, and recommendations. The study focuses on critical aspects such as the favored 3D modeling software among participants, the challenges they encountered, and their aspirations to be part of larger game development teams.

This informs practical inquiries concerning software choices and offers valuable perspectives for students, educators, and developers. The research collected 240 responses from current students and alums of DIU MCT, representing roughly 20% of the overall population of 1,270. The limited sample size may hinder broader applicability, as it may not fully capture the diverse variations in the total population, making generalization of the results challenging.

3.1 Research Design and Approach

The study utilizes a qualitative method to obtain insights into undergraduate students' preferences, challenges, and aspirations regarding 3D modeling software for mobile game development. Using a descriptive research design, it aims to identify the tools that students favor, the factors influencing their selections, and the obstacles they encounter in mastering 3D modeling.

A survey-based methodology was implemented to gather data from students within the Department of Multimedia and Creative Technology at Daffodil International University, Bangladesh. The study will concentrate on interpreting qualitative data,

including demographics, software preferences, and the perceived advantages and challenges associated with various tools. This methodological approach ensures a comprehensive analysis of the research questions.

3.2 Population and Sample Description

The target population for this research comprises undergraduate students enrolled in the MCT department at DIU. This selection is due to the department's offering of specialized programs, including multimedia, animation, and game design, which make its students ideal candidates for research concerning preferences for 3D modeling software.

Sample Size and Selection: The sample consisted of 240 students, representing approximately 20% of the Department of Computer Studies' total population of around 1,270 students. These participants have expressed an interest in developing mobile games and possess experience with 3D modeling software, and they were selected through a purposeful sampling approach.

Demographics: Descriptive data was collected regarding the gender, age, and academic standing of the respondents. A significant portion of the sample, 74.5%, identified as male, while 25.5% identified as female.

Although the sample is representative of the MCT department, it does not fully reflect the diversity of students across the broader university or other institutions.

3.3 Data Collection Tools (Survey Design)

The plan uses a structured survey to evaluate students' experiences and preferences with 3D modeling software. Consequently, I developed 24 questions and categorized

them into three sections: Personal Profile, Insights from Gaming Enthusiasts & Developers, and Technical Tools and Feedback.

Personal Questions:

1. Your Full Name
2. For research purposes, if our team members want to communicate with you, which of the following modes would you prefer?
3. Your Cell Phone Number (Optional)
4. Please Specify Your Gender
5. Which of the following age clusters perfectly describe you?
6. Which of the following roles perfectly describe you?
7. If you are a student, please write the name of your institution.
8. If you are a job holder, please write the name of your organization.
9. If you are a job holder, please specify your role in the organization (e.g., Graphic Designer).

The nine questions presented are crucial for gaining insights into the participants' demographics and preferred communication modes. Inquiring about the participant's name, contact preference, gender, and age group allows us to classify and categorize responses, aiding in targeting specific demographics for data analysis. Furthermore, this section addresses the educational or professional background of the participant, including the institution they attend or the organization they work for, along with their job title. This will assist in filtering responses based on their position or educational qualifications, providing more valuable insights into their perspectives on the development of mobile games.

Gaming Enthusiast Questions:

1. Are you interested in playing mobile games?
2. Are you interested in developing mobile games?

3. Have you received any professional training on game development?
4. If your response to the previous question is Yes, then please specify the duration of the training period.
5. If you are given the chance to work on a large game development team, in which role would you like to see yourself?
6. How many years of experience do you have in mobile game development?
7. Do you know the differences between game engines and 3D modeling software?

In these seven questions, we explore the participants' interest in mobile gaming and game development, as well as their professional training and experience. We inquire whether individuals are engaged in mobile game development or have received formal training, as this provides valuable expertise-related insights. Furthermore, we ask about their preferred roles within a game development team and the duration of their involvement in the field. This section is crucial for assessing the participants' level of experience and passion for game development.

Technical Tools and Feedback:

1. Which 3D software do you prefer for asset development in your game development project?
2. What type of mobile game would you like to pick as your initial/first game development project?
3. Which of the following challenges are you facing while using the software of choice for your game development project?
4. Which of the following advantages are you getting while using the software of choice for your game development project?
5. If you are given the opportunity to give feedback on improvements you would like to see in the future version of the 3D modeling software of your choice,

what specific feedback would you like to give? (Please separate your feedback with commas.)

6. What is the model and brand name of your cell phone? (e.g., Samsung S24 Ultra)
7. From when are you using your current cell phone? (e.g., December 2023)
8. What is the model and brand name of your previous cell phone?

The eight questions highlight the importance of selecting the preferred software for 3D modeling in the creation of mobile games. The aim is to identify the software participants favor and the types of mobile games they aspire to develop. Additionally, it addresses the challenges they face and the benefits they gain from using specific software. Gathering feedback is crucial, so participants are invited to offer suggestions on how their preferred software could be enhanced in future versions. Lastly, this section inquires about the models of mobile phones that participants currently use or have previously used, helping us to understand whether these devices impact their gaming or development experiences.

Structure of the Survey:

Demographics: Data on age, gender, and academic background are collected.

Software Preferences: Assessment of the types of 3D modeling software utilized, including but not limited to Autodesk Maya and Blender, and the reasons for these choices.

Challenges: Exploration of difficulties encountered while learning or using 3D modeling tools, focusing on interface complexity and the modeling of intricate objects.

Training and Skill Development: Evaluation of questions about formal training, self-learning approaches, and preferred durations for workshops or courses.

Professional Aspirations: Inquiry into career interests within game development, specifically in roles such as 3D artistry, animation, or technical programming.

Survey Administration: The survey was conducted offline to facilitate participation and accessibility for students with varying schedules. Tools like Google Forms were employed for data collection, aiding in the organization and analysis of the responses. Data were gathered from individual students in multiple classes with the support of their respective instructors using Google Forms.

3.4 Data Analysis Methods

The data collected from the survey was utilized to gain insight into participants' preferences, difficulties, and experiences with 3D modeling software. This methodology thoroughly examined quantitative trends while gathering more nuanced insights from open-ended responses.

Descriptive Statistics: Quantitative details, including demographic data, favored software options, and encountered challenges, were analyzed using descriptive statistical techniques. Frequencies and percentages were computed to illustrate how participants answered specific inquiries. These served as a solid foundation for identifying general patterns within the dataset. The results were visually represented through pie charts and bar graphs for better understanding, utilizing graphical presentation tools extensively to showcase the findings. They effectively summarized the data and highlighted key aspects, such as the most popular software and the challenges most frequently reported by respondents.

Thematic Analysis: The qualitative analysis of responses from the open-ended survey was carried out through thematic analysis. This process involved recognizing, coding, categorizing, and analyzing recurring patterns and themes within the text. For instance, responses provided insight into the reasoning behind software selection, focusing on themes like usability, cost-effectiveness, and functionality. Additionally, the thematic analysis revealed participant recommendations for improvements, such as simpler interfaces or more training opportunities. This approach offered perspective on participants' viewpoints and enhanced the quantitative findings.

Cross-tabulation: Cross-tabulation was employed further to enrich the analysis of the interrelations among variables. For instance, the correlation between formal training and enhanced skill levels with different 3D modeling software was explored. This method aided in identifying trends regarding whether participants with formal training exhibited superior proficiency in utilizing advanced features compared to those who were self-taught.

Ultimately, the findings were compared to existing literature for contextual understanding. This comparison helped identify areas where the current findings aligned or diverged from previous research and offered insight into how this study contributed to the existing literature concerning 3D modeling software preferences and challenges.

3.5 Ethical Considerations

Ethical considerations were diligently maintained throughout this research. Respondents' integrity, credibility, and rights as participants were prioritized. Informed consent was a key focus at every stage of the research process. The research goals, aims, and methods were thoroughly communicated to potential participants. Participation was entirely voluntary, and individuals could withdraw at any time

without any repercussions. Informed consent: Prospective participants were given comprehensive information about the nature of the data being collected and its intended use before being asked for their consent to participate. Anonymity and confidentiality were rigorously upheld during this study.

All gathered data was anonymized to ensure that specific data could not be traced back to individual respondents. Personal information, including demographic details, was securely stored and accessible only to authorized researchers. Participants were assured that their information would be kept private. Moreover, it is used solely for research, without any disclosures that could compromise their privacy. This commitment to confidentiality helped build trust, encouraging participants to respond honestly and openly. To ensure non-maleficence, the design of the research study aimed to avoid causing harm to participants. Sensitive or potentially upsetting topics were deliberately excluded.

Questions were crafted to avoid encroaching on private matters, concentrating on preferences and difficulties related to 3D modeling software, which minimized any risks of discomfort or embarrassment. Participants were also given the research team's contact details if they needed clarification or encountered issues during the research process. The study was grounded in ethical standards, ensuring the findings were credible and reliable. Data management was conducted meticulously to ensure accuracy in the analysis. No data was fabricated or manipulated, and results were reported honestly and transparently.

Additionally, the works of other researchers were acknowledged through accurate citations of all references and theoretical frameworks. This strict adherence to academic standards highlighted the research's reliability and further bolstered its credibility. The research honored participants' autonomy, transparency, and fairness. By focusing on ethical aspects like informed consent, confidentiality, non-maleficence, and academic integrity, this study safeguarded the participants' dignity, rights, and welfare. Implementing these measures enhances the credibility of the findings and establishes a framework for ethical and respectful research.

CHAPTER 4

Result

The research involved a survey of 240 undergraduate students from the Department of Multimedia and Creative Technology (MCT) at Daffodil International University (DIU). Most respondents were male (74.5%), and most fell within the 18 to 24 age bracket (89.1%), a group typically associated with emerging talent in mobile game design. A significant 84.5% expressed interest in playing mobile games, and 62.8% were keen on mobile game development, highlighting a robust potential in this area. Conversely, 37.2% were not interested in pursuing game development as a profession, indicating diversity in their career aspirations.

Interestingly, none participants received formal training; 83.3% noted that they learned independently using online tutorials or community resources. Only 16.7% reported receiving professional training, with 32% having trained for less than a month. This reliance on informal education suggests a strong demand for more accessible, structured training options.

Nearly 40% of respondents desired creative roles on a game development team, such as 3D Artist or Environment Artist. UI/UX Design followed with 14.2%, while interest in technical roles like Engine Programming and Animation was moderate. The least favored options included managerial roles and Sound Design, indicating a preference for creative and design-oriented tasks over purely technical or administrative positions. Additionally, 92% had never developed a mobile game, demonstrating a significant need for foundational education.

Regarding preferences for 3D modeling software, Autodesk Maya was the most favored at 48.1%, followed by Blender at 17.2%. The factors influencing these choices included

functionality, cost, user-friendliness, and industry relevance. Students preferred Maya due to its extensive toolset and professional usage, while Blender was favored because it is free and open-source. Nonetheless, 16.3% admitted not being familiar with any 3D modeling software, indicating a knowledge gap in this group.

The challenges associated with using 3D modeling tools were significant. A considerable number of respondents, 20.1%, mentioned a lack of familiarity with the software, while 18.0% found the interfaces challenging to navigate. Issues such as high licensing fees and hardware requirements further complicate these challenges. Despite these obstacles, participants noted several advantages, including powerful modeling features 17.2%, high-quality rendering, and seamless integration with game engines.

Action games were the most frequently chosen first development projects, accounting for 33.9%, followed by puzzle and strategy games. This indicates a strong interest in creative roles and mobile game design and underscores the need for formal training and accessible resources to bridge existing skill and knowledge gaps.

4.1 Demographic Profile of Respondents

The research involved surveying 240 undergraduate students from Bangladesh's Department of Multimedia and Creative Technology (MCT) at Daffodil International University (DIU). The distribution of demographics includes:

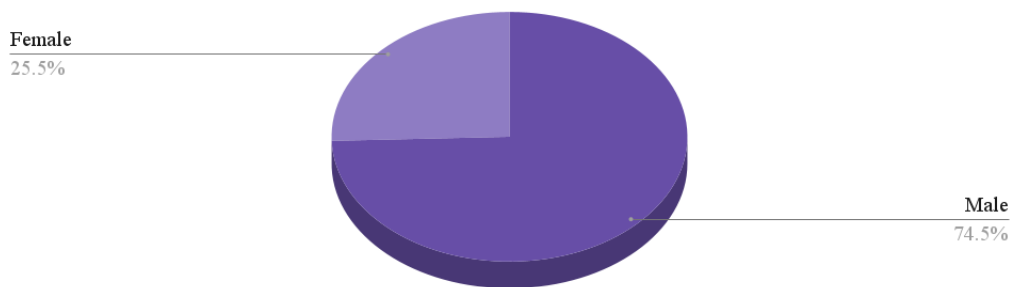


Figure 1: Distribution of Respondents by Gender.

The pie chart depicts the distribution of genders among participants who responded to the question, "Please specify your gender?" The data reveals that 74.5% of those surveyed identified as Male, accounting for the majority of respondents in this study. In contrast, 25.5% of participants identified as Female, making up a smaller segment of the surveyed group.

Most participants fell within the typical undergraduate age range of 18–24 years, representing a key demographic for emerging talent in the game development industry.

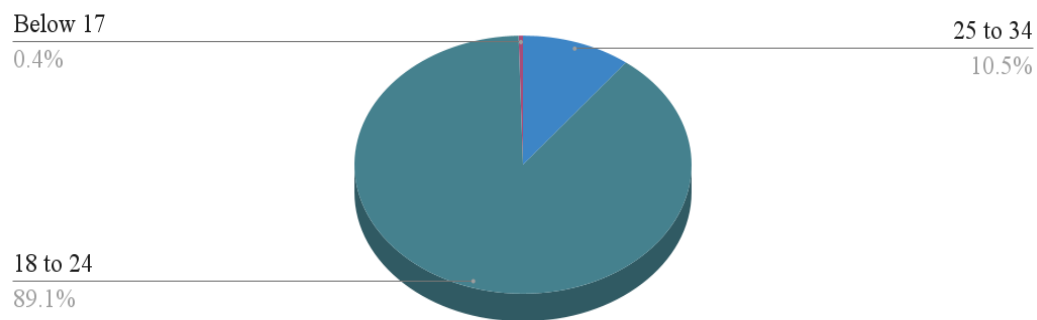


Figure 2: Age Distribution of Respondents.

The participant demographics primarily consist of individuals aged between 18 and 24, accounting for 89.1% of the total. Meanwhile, those in the 25 to 34 age bracket, representing early to mid-career stages, make up 10.5% of the participants. Additionally, respondents below 17 comprise a mere 0.4%, indicating minimal involvement from younger participants.

An overwhelming 84.5% of participants indicated a keen interest in mobile games, highlighting their widespread popularity. This interest extends to a strong enthusiasm for mobile game development, as 62.8% of those surveyed expressed a desire to participate.

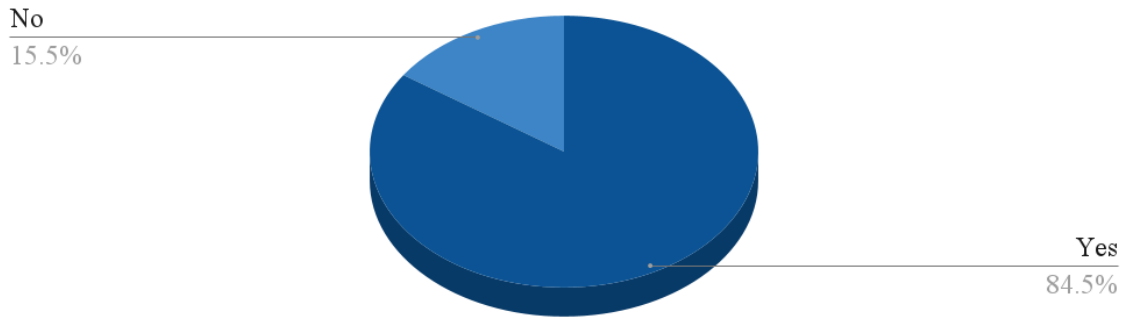


Figure 3: Respondents are interested in playing mobile games.

To begin with, the participants in the study are the researchers themselves, who were queried about their interest in mobile games. "Are you interested in playing mobile games?" [19]. The pie chart in Figure 3 displays the level of interest in mobile gaming among the survey participants. There is a notable enthusiasm for mobile gaming within the surveyed group. A substantial 84.5% of those surveyed indicated an interest in mobile games, highlighting the widespread attraction and engagement with this type of entertainment. On the other hand, only 15.5% showed a lack of interest, indicating that the proportion of individuals not involved in mobile gaming is quite small.

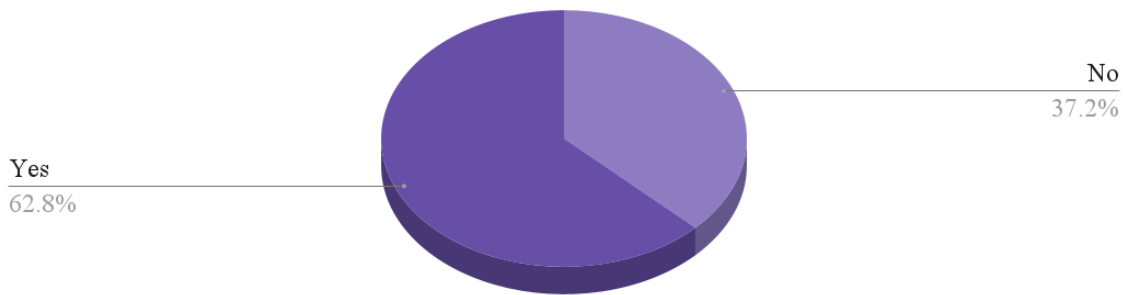


Figure 4: Respondents showed engagement in Mobile Game Development.

This is the same type of question asked in the research of (Ariff M. et al. 2020), to deduce a result. As the science of this research falls into the same domain, we chose to put this question on this survey: "Are you interested in developing mobile games?"[20]. Pie chart showing the response from most respondents Figure 4: Interest in mobile game

development: 62.8% showed interest in developing mobile games. This indicates that most are very interested in taking part in game development. While on the other hand, 37.2% were not interested in mobile game development.

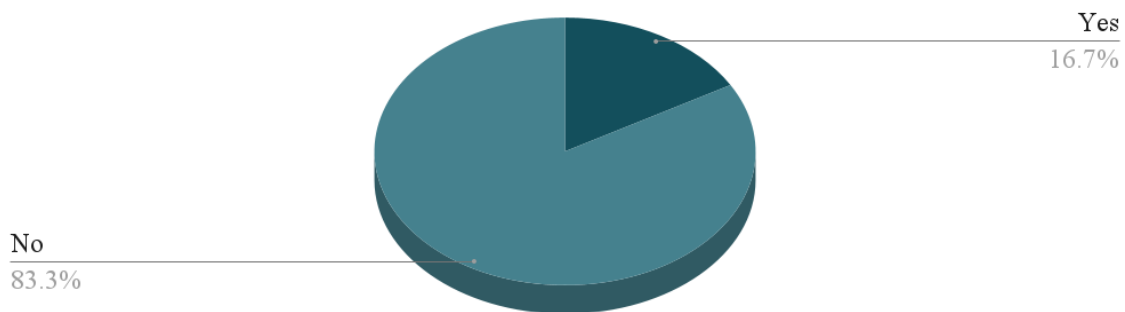


Figure 5: Game Development professional training graph.

Figure 5 Pie chart showing the answers to the survey question "Have you received any professional training in game development?"[21] The results showed that only 16.7% of respondents had received formal training in creating games, while fully 83.3% of the respondents reported never having received any formal training in creating games. A pie chart emphasizes an important aspect of competency building in the game development sector. With a huge part of people having no professional education, amateur and professional game developers would likely be self-directed and heavily use some informal ways of learning: online courses or resources or cooperative activity from their communities.

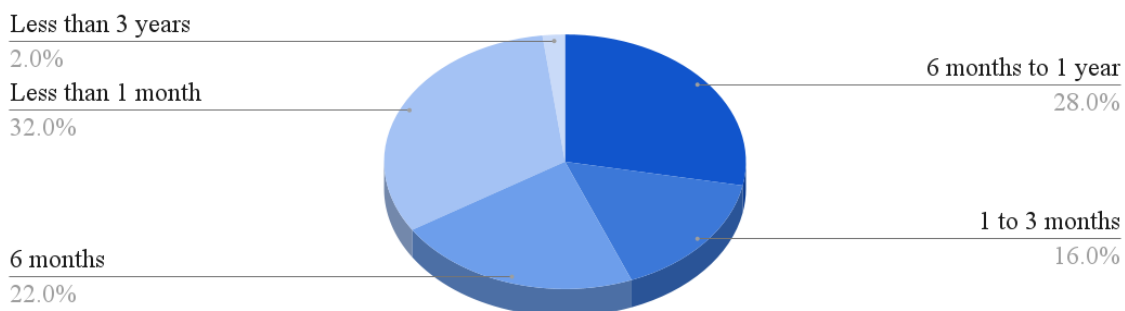


Figure 6: Length of Professional Training in Game Development for Participants.

This pie chart illustrates the breakdown of responses concerning the length of training periods for individuals who answered "Yes" to a previous question, as shown in Figure 6. The findings show that most training programs are short-term, with 32% of participants indicating a training duration of less than 1 month. Furthermore, 16% indicated a training span of 1 to 3 months, reflecting a notable inclination towards shorter training periods. Mid-term training programs are also standard, with 22% of respondents experiencing training lasting 6 months and 28% reporting durations between 6 months and 1 year. In contrast, long-term training is uncommon, with only 2% stating a training period of less than 3 years.

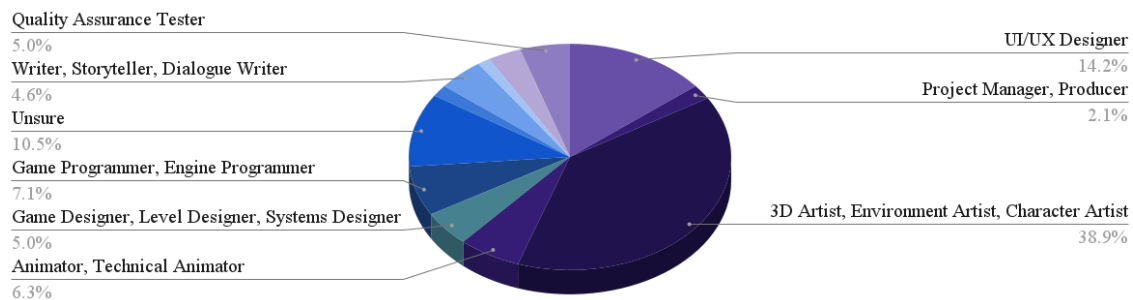


Figure 7: Preferred Positions in an Extensive Game Development Team: Insights from Participants.

Figure 7 presents several key insights regarding job preferences: "If you are given the chance to work on a large game development team, in which role would you like to see yourself?"[21]. Creative positions dominate the choices, with nearly 40% of participants aiming to become 3D Artists or environmental artists. Additionally, a notable segment expressed interest in UI/UX Design, representing 14.2% of the responses. Technical positions, including Engine Programming (7.1%) and Animation (6.3%), are moderately appealing, underlining their significance in game development. Conversely, roles such as Project Management (2.1%) and Sound Design (1.7%) attract less interest, indicating a need for more focused recruitment efforts or greater awareness of their importance. Interestingly, 10.5% of participants were uncertain about their desired role, highlighting a potential demand for career guidance or greater insight into the various opportunities

present in the game development sector. The chart underscores the preference for creative and design-focused roles, while technical and management positions garner comparatively lower interest.

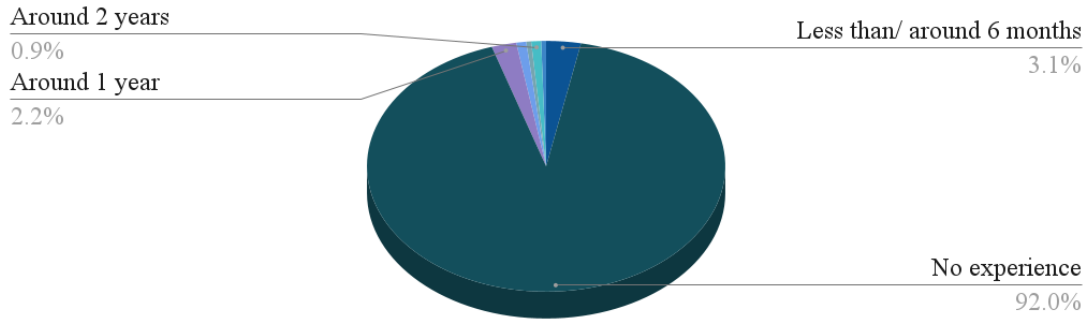


Figure 8: Levels of experience in mobile game development among participants.

Figure 8 presents the distribution of respondents based on their "How many years of experience do you have in mobile game development?"[13]. The most significant proportion of respondents are beginners or newcomers in developing mobile games, as indicated by the overwhelming 92% who reported having no experience in mobile game development. Only a tiny percent of respondents reported having some experience; 3.1% reported having less than or about six months' experience, 2.2% had one year or more, and only 0.9% reported having two years or more. These results demonstrate the extent of novices in mobile game development by indicating that experienced respondents represent a relatively small percentage of the sample.

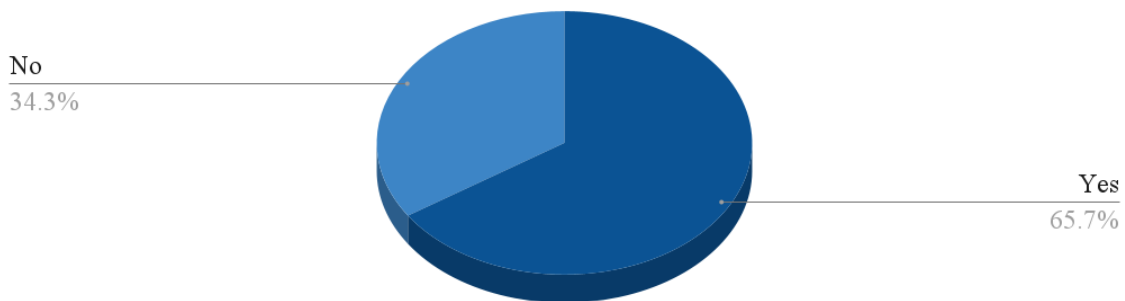


Figure 9: Differences Between Game Engines and 3D Modeling Software.

The following pie chart indicates the response to the question, "Do you know the differences between game engine and 3D modeling software?" [22]. It is presented above in Figure 8. 65.7% of the respondents believe they know the difference, and hence, they have shown very sound experience groundwork in this domain. However, nearly one-third of the participants developed a knowledge gap, as 34.3% answered that they did not know the differences.

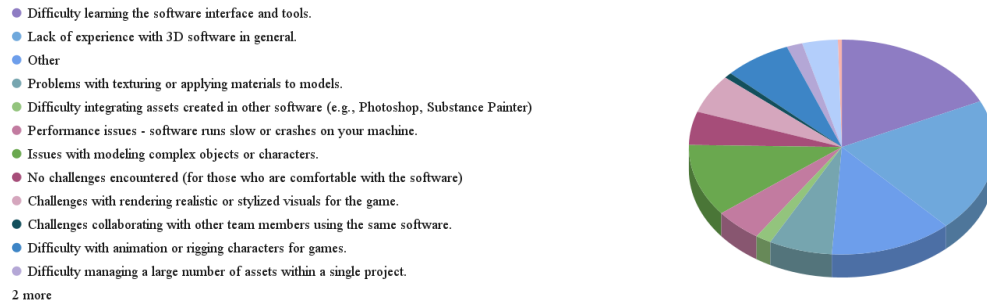


Figure 10: Challenges Faced While Using 3D Software for Game Development Projects.

The pie chart "Which of the following challenges are you facing while using the software of choice for your game development project?" [23]. It is illustrated in Figure 10. According to the data, 20.1% of respondents identified a general lack of knowledge regarding 3D software as their primary obstacle. After that, 18.0% reported difficulties understanding the program's interface and functionality. Issues related to modeling complex objects or characters accounted for 10.9%, while other challenges represented 13.0%. Further, 7.1% of respondents experienced difficulties with animating or rigging characters, and 6.7% faced challenges in texturing or applying materials to models. Additionally, 5.9% reported trouble creating realistic or stylized images, while 5.0% stated they encountered no problems.

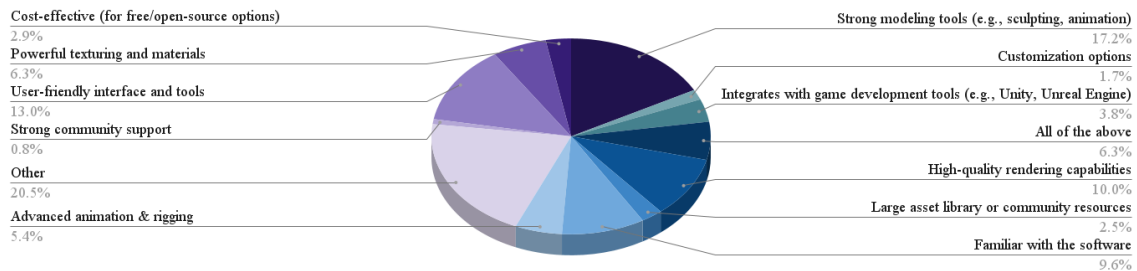


Figure 11: Advantages of Using 3D Software for Game Development Projects.

The benefits that respondents identified about the question, "Which of the following advantages are you getting while using the software of choice for your game development project? " [23] are illustrated in Figure 11. Notably, 17.2% of respondents cited powerful modeling capabilities—such as sculpting and animation—as the most frequently mentioned advantage. Tools and an intuitive interface ranked second at 13.0%, while "other" benefits comprised 20.5%. Additionally, 10.0% noted high-quality rendering capabilities, and 9.6% mentioned the advantage of familiarity with the software. Powerful texturing and materials were referenced by 6.3%, while integration with game production tools like Unity and Unreal Engine was acknowledged by 3.8%. Strong community support was the least mentioned benefit at 0.8%, customization options were noted by 1.7%, and cost-effectiveness (mainly for free or open-source solutions) received 2.9% of the responses.

These data suggest that while a significant portion of individuals are interested in game development, a noteworthy minority remains disengaged. This could indicate potential barriers such as a lack of technical skills, insufficient resources, or personal preferences for other creative or professional pursuits. The findings highlight an opportunity for growth in this field, primarily through targeted training or incentives for those contemplating entry into the industry.

4.2 Most Preferred Software

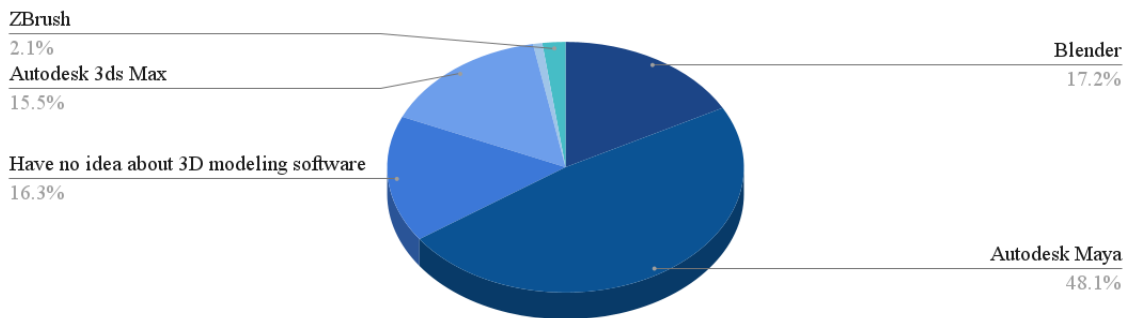


Figure 12: 3D Modeling Software among Respondents in Game Development Projects.

Figure 12 illustrates the preferences of respondents regarding "Which 3D software do you prefer for asset development in your game development project?"[24]. Autodesk Maya emerged as the top choice, with 48.1% of the participants selecting it. Following closely behind, Blender received 17.2% of the respondents' votes, while 16.3% indicated they had no knowledge of 3D modeling. ZBrush was the least favored, chosen by only 2.1% of respondents, while Autodesk 3ds Max garnered 15.5% of the preferences.

4.2.1 Factors Influencing Preferences

Several elements were recognized as influencing participants' selection of 3D modeling software.

Software like Maya and Blender were favored due to their comprehensive feature sets, encompassing sculpting, rigging, texturing, and rendering abilities. Participants appreciated software that could accommodate a wide range of asset creation requirements.

Blender's free, open-source nature was particularly appealing to students, whereas the expense of Autodesk products made them unattainable for anyone lacking institutional backing.

Additionally, Blender was noted for its ease of use. Although Maya was a professional-grade tool in many respects, it was intimidatingly complicated for newcomers; Blender's customizable aspects helped address some of its usability issues.

The presence of a large, active user community, along with extensive online tutorials and forums, also benefited these software programs, aiding participants in overcoming their learning challenges.

Alignment with industry standards was a significant consideration for many participants. Those aiming to join game development studios found Maya more suitable.

4.3 Challenges in Using 3D Modeling Software

Participants reported facing significant challenges when working with 3D modeling programs, citing a steep learning curve and a scarcity of training opportunities. A substantial 83.3% indicated that they had no formal training, relying instead on self-directed learning and informal resources, which limits their ability to cultivate professional skills.

Another major obstacle was navigating the complex software interface and functionality; 18.0% of participants, particularly beginners, had difficulty adapting. Additionally, 10.9% experienced challenges in modeling intricate objects or characters, suggesting that specialized training is essential for success.

Moreover, students faced limitations due to resource-related issues, including the high costs of software licenses and the increased hardware requirements of advanced programs like Autodesk Maya. Smaller groups of respondents also reported specific technical challenges, such as texturing, rigging, and character animation, highlighting gaps in essential technical competencies. These results highlight the critical requirement for readily available resources, including training and resources to help overcome these barriers effectively.

4.4 Advantages of Using 3D Modeling Software

Despite the challenges, several benefits of utilizing 3D modeling software in game development were identified.

Robust Modeling Features: Tools like Maya and Blender were very effective due to their diverse functionalities, including sculpting and animation; 17.2% of the respondents highlighted this benefit.

Enhanced Creativity: The ability to craft unique and visually appealing assets was a significant incentive for participants, particularly those interested in creative positions related to 3D artistry and environment design.

Seamless Integration with Game Engines: Many respondents noted that 3D modeling software works well with widely used game development platforms like Unity and Unreal Engine, facilitating a smoother development process.

Superior Rendering Quality: The advanced rendering features of these tools were favored for producing professional-level assets.

Community Assistance: The vast array of online tutorials, forums, and plugins played a crucial role in helping participants overcome their learning obstacles.

4.5 Trends in Mobile Game Development among Respondent

The study uncovered several intriguing trends in mobile game development among the undergraduate students of DIU MCT. A significant 62.8% of the participants wanted to create games for mobile platforms, indicating a strong passion for the field. From a creative perspective, the respondents showed considerable interest in roles such as 3D artists and environment designers, with 40% aspiring to pursue visually-focused careers in game development.

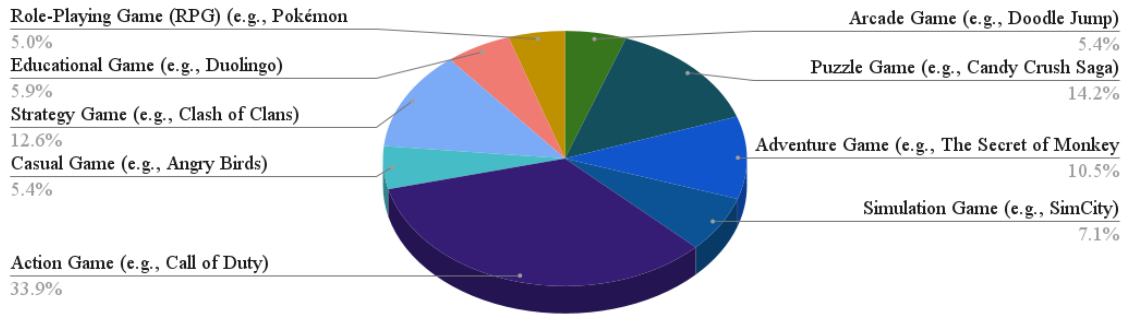


Figure 13: Presenting Preferences for the Initial Development of Mobile Gaming Projects.

The question "What type of mobile game you would like to pick as your initial/first game development project?"[25] is illustrated in Figure 10. Action Games are the most favored genre, accounting for 33.9% of the preferences, making them the top choice for an initial project. Following closely are Puzzle Games, which make up 14.2%, and Strategy Games at 12.6%, indicating a strong interest in games that require problem-solving or strategic thinking. In fourth place are Adventure Games, such as The Secret of Monkey Island, with a popularity rating of 10.5%, demonstrating significant appeal. Simulation Games, like SimCity, are at 7.1%, while Educational Games and Casual Games represent 5.9% and 5.4% of the selections, respectively. Arcade Games, such as Doodle Jump, also garner a response of 5.4%. Role-Playing Games (RPG) received the lowest preference, with only 5.0% choosing them, citing examples like Pokemon Go.

CHAPTER 5

Discussion

The research has comprehensively examined the preferences, challenges, and aspirations of DIU MCT undergraduates regarding their selection of 3D modeling software for mobile game design. The findings reflect global trends and provide valuable insights within the Bangladeshi context.

The study identifies Autodesk Maya as the preferred software, with 48.1% of participants selecting it due to its advanced animation and rendering capabilities and its alignment with industry standards. Blender emerges as a notable alternative at 17.2%, primarily because it is affordable and open-source, boasting a vibrant community. Other software options, such as 3ds Max and ZBrush, are acknowledged for their specialized uses, including architectural modeling and digital sculpting. This indicates an awareness of both industry-standard software and more accessible alternatives. The key factors influencing these preferences include usability, affordability, and features. While Maya offers professional-grade tools that help students meet industry standards, its complex interface and high licensing costs present significant barriers. Conversely, Blender is well-suited for students operating on limited budgets, given its open-source nature and continuous updates. The study highlights difficulties such as steep learning curves and challenges in navigating interfaces and modeling intricate objects, reported at 18% and 10.9%, respectively, underscoring the need for more accessible and user-friendly tools.

The lack of formal training is a notable concern, with 83.3% of students relying on self-directed learning through online tutorials. However, these flexible pathways often result in a fragmented understanding and skill gaps. Financial constraints further exacerbate these issues, limiting access to licensed software and other essential resources.

To address these challenges, the research suggests incorporating formal training programs into the curriculum, ranging from beginner to advanced levels, and organizing specific workshops focused on practical challenges. Collaborations with industry can provide students access to licensed software, mentorship, and real-world workflows. Additionally, software providers should consider offering educational licenses and designing more user-friendly interfaces tailored for novices.

5.1 Interpretation of Results in Light of Objectives

The study aimed to uncover DIU MCT undergraduates' preferences, challenges, and expectations regarding the 3D modeling software utilized in mobile game development. The results shed light on these elements, aligning with the goals of this research and offering insights valuable to educators and industry professionals.

Objective 1: Identify the Most Preferred 3D Modeling Software

The research indicates that Autodesk Maya is the top choice among students, with 48.1% of participants selecting it as their primary software. This dominance showcases Maya's reputation as professional-grade software with advanced features that fulfill nearly all game development requirements: intricate animation and rigging, high-quality rendering options, and extensive plugin support establish it as a standard in the game development industry.

Blender, the second most preferred software at 17.2%, is a notable alternative, mainly because it is open-source and free. Blender's rich capabilities make it an appealing option for budget-conscious students and independent developers. The growing community support and frequent updates have enhanced Blender's usability, reinforcing its popularity in academic and amateur circles.

Preferences for other software included 3ds Max at 15.5% and ZBrush at 2.1%, indicating distinct needs among the students. For example, 3ds Max is favored for its precision in modeling architectural settings, while ZBrush is typically selected for its capabilities in digital sculpting with detailed characters and organic structures. These findings highlight the diverse applications of 3D modeling software and the varying requirements among students based on their career aspirations.

Objective 2: Factors Affecting Software Preference

Several factors influence students' preferences for specific software: user-friendliness, cost, and feature-richness.

User-Friendliness: Many game development projects utilize Maya due to its intuitive interface and streamlined workflow. However, 18% of participants expressed difficulties with the interface, and 10.9% noted dissatisfaction with modeling complex objects, revealing a need to balance advanced functionality with ease of use.

Cost: Blender's popularity supports the idea that affordability is a key consideration, especially for students lacking financial resources. Its open-source nature enables students to access professional-grade software without the burden of costly licenses, making it particularly attractive for newcomers.

Features: The preference for both Maya and Blender can be attributed to their sophisticated capabilities. Maya's advanced animation and rendering features cater to the demands of professional game development, while Blender accommodates a wide range of creative and technical requirements.

Objective 3: Challenges Faced by Students

The primary challenge identified among DIU MCT undergraduates was the lack of formal training, with 83.3% relying on self-taught methods. This informal learning

approach often results in a disjointed understanding and difficulty mastering complex software.

Students specifically noted challenges such as: Navigating Software Interfaces: Many students find it challenging to manage the complexity of professional tools, with 18% of responses highlighting significant navigation issues within the interface.

Modeling Complex Objects: Additionally, 10.9% of respondents reported struggles creating realistic and detailed assets, indicating gaps in their technical skills. The limited access to licensed software and hardware further complicates these challenges, hindering students' ability to utilize the available tools fully.

Objective 4: Recommendations to Improve

Recommendations aimed at addressing the identified gaps and issues in future development courses include:

Formal Training Programs:

All academic institutions should integrate thorough and professional training courses focused on 3D modeling software. These sessions should be well-targeted, covering beginner, intermediate, and advanced levels across various topics.

Industrial Partnerships:

Collaborations with industry stakeholders would provide students access to licensed software, mentorship opportunities, and real-world project experiences. This partnership would help overcome resource limitations and familiarize students with professional workflows.

Short-term Workshops: Workshops focusing on introductory techniques and advanced functionalities could address specific challenges students encounter, such as interface

navigation and object modeling. These specialized sessions can significantly enhance students' skills and confidence in 3D modeling software.

Ease of Access: Software companies should offer educational licenses or discounts to students to eliminate financial barriers to learning.

5.2 Alignment with Existing Literature

These results correspond with findings from numerous global studies while offering particular insights into the experiences of DIU MCT undergraduates. Investigating the preferences, challenges, and aspirations of students in Bangladesh introduces a new dimension to the literature on 3D modeling and game development.

Software Preferences and Adoption

The preference for Autodesk Maya and Blender among DIU MCT students mirrors established global trends in using 3D modeling software. Autodesk Maya, known for its extensive features, including advanced animation, rigging, and rendering capabilities, was selected by 48.1% of respondents. This supports industry research indicating Maya as the preferred software for professional game developers due to its adaptability and capacity to manage complex projects.

In contrast, Blender's popularity is 17.2%, signifying its adoption because it is free and open-source. Studies suggest Blender democratizes access to high-quality 3D modeling, particularly for students and independent developers on limited budgets. The open-source nature of Blender, combined with strong community support, positions it favorably for those searching for an affordable option that does not compromise on essential features.

This could highlight students' practical decisions when choosing tools in Bangladeshi institutions. On one hand, the preference for open-source tools like Blender reflects

financial constraints. Conversely, Maya's high preference indicates students' aspirations toward industry standards. This finding points to a need for a multi-faceted curriculum that integrates training on both professional-grade tools and accessible alternatives.

Difficulties of Learning and Utilization

The challenges faced by DIU MCT students when using 3D modeling software reflect some global educational trends. A notable number of participants reported struggling with software interfaces (18% of the time) or modeling intricate objects (10.9%). These results align with research that identifies steep learning curves and technical intricacies of professional tools as common hurdles for beginners.

In this context, 83.3% of respondents indicated that their reliance on self-directed learning aligns with global trends, where aspiring developers frequently utilize online tutorials and community forums as informal educational resources during their development journeys. While these methods provide flexibility, many resource channels lack the structured guidance to master advanced software. This correlates with research highlighting the need for formal training to close gaps in technical competencies.

Limited access to licensed software and high-level training in Bangladesh exacerbates the issue. The scarcity of affordable resources transforms the preference for open-source tools like Blender from merely a choice into a necessity. Addressing these challenges requires targeted strategies regarding educational licenses and user-friendly interfaces tailored for beginners.

Interest in Creative Roles

The intense enthusiasm among DIU MCT students for creative roles, such as 3D artistry and environment design, aligns with global trends that reflect the allure of visually engaging and artistic careers in the gaming industry. About 40% of respondents

expressed interest in these positions, underscoring a universal attraction to creativity and storytelling within game development.

This discovery corresponds with studies highlighting the significance of developing artistic skills alongside technical expertise. Roles like 3D artistry demand proficiency in tools such as Maya and Blender and a solid grasp of design principles, color theory, and spatial visualization. Students clearly articulate their career aspirations by focusing on these positions, underlining the necessity for specialized training programs to enhance technical and creative abilities.

This intense interest presents a significant opportunity for educational institutions and industry stakeholders to invest in creative education in Bangladesh. Educators should actively pursue collaborations with professional game studios, equipping students with essential skills for these roles.

Localized Insights

While these findings resonate with international research, they also offer a detailed view of student's unique challenges and opportunities in the Bangladeshi context. The financial factors driving the choice of Blender, the dependence on informal learning avenues, and strong career ambitions all highlight a specific situation that cannot be addressed with generic solutions.

The study adds to existing literature by reiterating that access, user-friendliness, and affordability influence students' software choices in developing regions. Furthermore, it advocates for tailored interventions that consider the unique circumstances experienced by these individuals.

5.3 Implications for Aspiring Game Developers

The results have important implications for amateur game developers but, more so, for the students in DIU because there is immense pressure for self-directed learning as there is such a large gap between the formal training. One has to use tutorials online proactively and community forums to learn and achieve goals. Mastery over advanced features and workflows requires structured guidance rather than mere self-learning.

The preference for free, open-source tools like Blender underlines the financial constraints faced by students. Access to affordable or free tools is very important in order to create equal opportunities among students for game development. Universities can collaborate with software providers to provide educational licenses or discounted packages that enable students to access industry-standard tools without any financial barriers.

Moreover, the significant interest in the creative roles of 3D art and environment design requires special training for such skills. It will position them to meet industrial demands and thus increase their chances of securing a career. Targeted workshops or short-term training programs prepare students for a competitive game development industry in these creative roles. The findings emphasize accessible resources, formal training, and industry-aligned skill development to support aspiring game developers.

5.4 Recommendations for Educators and Industry

The research highlights important suggestions for educators and the game development sector to aid budding developers effectively.

For Educators: Educational institutions should incorporate specialized training in their curricula focusing on essential 3D modeling tools like Maya and Blender. These courses can progress from foundational knowledge to advanced skills, enabling students to

acquire expertise comprehensively. Additionally, short-term workshops addressing practical concerns, such as navigation of interfaces or object modeling, will help close knowledge gaps and boost students' confidence.

It should also prioritize project-based learning, encouraging students to develop game assets from the initial concept to execution. This strategy connects theoretical understanding with practical application. Partnerships with game studios and software developers can offer access to professional tools, mentorship initiatives, and real-world projects, aligning educational programs with industry needs.

For the Industry: Software developers should improve usability by creating more user-friendly interfaces and beginner-oriented workflows, particularly for 3D modeling, to lower the entry barriers and attract more users. This can be achieved by providing low-cost or free educational licenses to educational institutions, alleviating financial obstacles for students seeking access to industry-standard software.

Furthermore, establishing training programs, hackathons, and competitions can nurture skills and innovation among emerging game developers. Such activities enhance technical abilities and foster a competitive and creative learning environment. The growth of online communities and knowledge-sharing platforms can facilitate ongoing learning at all levels and build a strong personal and professional growth network.

By adopting these suggestions, educators and industry partners can tackle the challenges identified in the research, such as insufficient training, accessibility concerns, and skills deficiencies. These measures will create a nurturing environment, empowering students to overcome obstacles and excel as aspiring game developers. Ultimately, these initiatives will prepare students to meet the evolving demands of the game development industry, fostering innovation and creativity while broadening opportunities in this vibrant field.

CHAPTER 6

Conclusion

The study examines the preferences and issues of DIU MCT undergraduates in Bangladesh regarding 3D modeling software to create mobile games. It emerged that Autodesk Maya, with a percentage of 48.1%, is the most preferred tool, followed by Blender with 17.2%, which corroborates the literature on the effectiveness of these tools in creating game assets. However, an overwhelming 83.3% have no professional training, meaning they are more self-taught or have had informal instruction, which itself may not really give them the technical competencies of the profession.

A full 40% were interested in such creative roles as a 3D artist and environment designer; most wanted specific training to acquire those skills. The challenges involved, for instance, are interface problems-18%, and the modeling of some objects is complex, for 10.9%, pointing out a need to make those tools more accessible to, and more friendly for, beginners.

Although the study's scope is limited to DIU MCT students, it provides valuable insight into their preferences and challenges. Further research should be conducted to determine the factors that influence software selection and the relationship between training duration and skill proficiency, providing comprehensive solutions for aspiring 3D modelers.

6.1 Summary of Key Findings

The study explored the preference for, problems faced in using, and the need for training on 3D modeling software in the development of mobile games by undergraduate students of the Multimedia and Creative Technology Department, Daffodil International University, Bangladesh. The key findings of the present study are enumerated below.

Software Preferences:

Autodesk Maya was the most preferred 3D modeling software, with 48.1% of the respondents using it, while Blender came second with 17.2%. The reasons that lead to this choice include advanced features, ease of access, and compatibility with game engines.

Training Gaps:

83.3% of the participants have never received any formal training in game development or 3D modeling; hence, they rely on self-taught means, which calls for structured learning programs.

Challenges in Software Use:

Main pains are the complicated navigation in software interfaces 18% and modeling of complicated objects 10.9%. The results point toward a need for friendlier beginner tools and, in general, training resources.

Creative Aspirations:

Close to 40% expressed a strong interest in creative positions, such as 3D artistry and environment design; therefore, much emphasis should be placed on tools and training supportive of creativity

6.2 Contributions of the Research

The research makes several significant contributions by focusing on DIU MCT undergraduates, thereby validating its relevance within a local context. It illustrates the preferences and obstacles encountered by students in developing areas such as

Bangladesh. These findings underscore the distinct needs of this group, providing essential context for understanding their experiences.

The study also offers actionable suggestions for educators, software developers, and industry stakeholders on implementing short-term workshops, formal training programs, and enhancements in the usability of 3D modeling software to assist beginners and improve educational outcomes.

Additionally, it bridges the research gap between academic training and industry demands by identifying discrepancies between academic education and professional expectations. It advocates collaboration to align educational curricula with industry standards, better preparing students for creative roles like 3D artistry and environment design.

Ultimately, the study lays the groundwork for future research by identifying key factors influencing software choice or challenges. This paves the way for further exploration into how these elements affect career readiness and the development of technical skills.

6.3 Limitations of the Study

Even this commendable research has numerous limitations: the overall number of respondents is 240 students, which makes up just 20% of the population in the MCT department at DIU, and such a small sample size provides minimal representation even within a more extensive student demographic or expansive gaming sectors.

The study has limited geographical and cultural scope, concentrating solely on Bangladesh and DIU; as a result, its conclusions cannot be widely applied to other regions of the world or different universities with varying cultural, economic, or educational environments.

Furthermore, several biases are likely due to dependence on self-reported survey information. Technical jargon might be misinterpreted, and socially acceptable behaviors could be overstated, thus impacting the accuracy of the findings.

Moreover, while the study has addressed software preferences and challenges encountered, it has not thoroughly examined earlier features considered, involved cost factors, or the influence of community support on the choice of specific software. These gaps highlight additional areas that warrant further exploration to strengthen the conclusions.

6.4 Directions for Future Research

Suggested areas for future research based on the findings and limitations include the following:

Expanded Demographic Examination:

Conduct studies similar to this across different universities, regions, and educational contexts to allow for comparisons and validation that broaden the understanding of preferences and challenges related to 3D modeling software.

Comprehensive Study of Influencing Factors:

Explore why students favor specific tools like Autodesk Maya or Blender, focusing on feature importance, cost-effectiveness, and user-friendliness.

Longitudinal Research:

Investigate how preferences and challenges evolve for students as they transition from education into their professional careers, taking into account training and practical experiences that shape their software application choices.

Usability Improvements:

Perform thorough usability studies to identify and remove obstacles in the interfaces of 3D modeling software, facilitating easier access for beginners.

Evaluation of Training Approaches:

Assess and compare various training methods, including workshops, online courses, and hybrid learning, to determine which is most effective in teaching 3D modeling skills to emerging game developers.

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