PREFERRED 3D MODELING SOFTWARE FOR MOBILE GAME DEVELOPMENT: A SURVEY ON DIU MCT UNDERGRADUATES

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

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APPROVAL

This Project titled "Preferred 3D Modeling Software for Mobile Game Development: A Survey on DIU MCT Undergraduates", submitted by Rifat Hossain 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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DECLARATION

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

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ABSTRACT

The gaming industry is increasing, and mobile game development is crucial to this growth because more people use smartphones. High-quality mobile games are needed, so choosing the right 3D modeling software becomes vital. This choice affects how efficiently games are developed and the quality of the game assets. This study examines what 3D modeling software undergraduate students in the Multimedia and Creative Technology (MCT) Department at Daffodil International University (DIU) prefer for mobile game development. By analyzing qualitative and quantitative data, this research aims to identify popular software options, understand what influences these choices, and suggest ways to improve training in 3D modeling for mobile game development.

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CHAPTER 1
Introduction

What is needed is the integration of state-of-the-art technologies with creative practices to offer different experiences within mobile game development. With the fast proliferation of smartphones and interest in mobile gaming, the industry has become an essential segment of the global entertainment market. From simple logic games to extraordinary multiplayer worlds, targets are immense, and the demand for high-quality visuals and smooth interactivity is high. That evolution largely depends on the role of 3D modeling software in creating stellar assets and realistic environments. Indeed, tools like Autodesk Maya and Blender support immersion into an environment. Such acting tools bridge the creative vision into technical execution; hence, such inventions boost innovation for mobile game developers. Mastering these tools usually comes with many challenges: an incomprehensible interface and the unavailability of more training opportunities. The present study has attempted to identify the preferences and difficulties related to 3D modeling software among undergraduate students in the Department of Multimedia and Creative Technology at Daffodil International University, Bangladesh. Such a study would also shed light on educators, industry professionals, and software tool developers with practical insights derived from the experiences of these students. This will, in turn, show students' tool preferences and why they preferred these tools. Results will fill in the current gap in training as provided in an academic environment compared to industrial needs, such that, in future game development professionals, the ability to successfully integrate into this very competitive field can be realized.

1.1 Background of Mobile Game Development

Mobile game development has grown into one of the fast-moving fields, catalyzed by rapid technological advancement and the omnipresence of smartphones and tablets. The mobile gaming industry is no longer stuck to casual entertainment but has expanded its areas of operation to include education, healthcare, and social impact. Mobile games are

tools for engaging and interactive learning, building creativity, collaboration, and problem-solving skills. The introduction of game engines like Unity3D and Unreal Engine revolutionized the development process by giving versatile platforms for creating games efficiently. Such engines allow developers to create immersive worlds, realistic physics, and smooth gameplay. Furthermore, integrated 3D modeling technology allows developers to enhance visual quality, thus rendering life-like environments and characters captivating for players, enhancing user experience.

Besides, the growth of mobile gaming has opened paths for independent developers and students to contribute significantly to the industry. With tools and resources now more accessible, anyone with creativity and determination can develop games that reach global audiences. While there is immense potential in developing mobile games, challenges still exist, especially for those aspiring developers who want to acquire the technical skills and resources necessary for success.

1.2 Importance of 3D Modeling Software in Game Development

It mainly deals with designing, animating, and integrating various visual elements within the game. 3D modeling software enables developers to create game assets, including realistic characters, props, and environments required in the gaming experience.

Among the various tools used for modeling in 3D, a few stand out because of the functionality and flexibility that each presents. Generally, features like sculpting, rigging, texturing, and rendering are strong and needed in Maya and Blender, apart from 3ds Max, for styled and hyper-real graphics. Indeed, Autodesk Maya is tacked with an advanced animation and rigging panel. At the same time, Blender maintains its openness, making it very reachable for all developers. Despite the advantages, 3D modeling software requires a significant amount of effort to master due to steep learning curves and confusing interfaces. The cost factor, licensing policies, and resource allocation will also be an important influence in choosing and adopting such tools. It is relevant for a student or amateur developer to understand these issues for informed decisions that are in the best interests of their goals and aspirations.

1.3 Overview of Research Focus

Therefore, The research study is dedicated to discovering the preferences, problems, and needs of undergraduate students specializing in multimedia and creative technology at Daffodil International University, Bangladesh. It also seeks to find out the following:

- The most preferred 3D modeling software among DIU students for mobile game development.
- The factors that influenced their software choices, such as technical features, ease of use, and accessibility.
- Barriers to learning and using such tools on the part of students, including lack of professional education and software interface complexity.

It is expected that the results of this study will provide educators, industry stakeholders, and software developers with some valuable insights into how these students can be better prepared for professional roles. This research contributes to a robust ecosystem for mobile game development by aligning training programs, curricula, and software features with the aspirations of future game developers.

1.4 Objectives of the Study

The following objectives guide the study:

- To find the most preferred 3D modeling software, analyze the preferred software that the students of DIU MCT use and the reasons behind their choice, such as Autodesk Maya or Blender.
- To assess the driving factors of software preferences:
  Analyze how the usability, features, cost, and accessibility influence the choices of students and their overall satisfaction related to 3D modeling tools.
- In trying to understand the challenges faced by the students:

Highlight the difficulties students go through during the learning and usage of 3D modeling software concerning interface complexity, lack of formal training, and limited resources.

- To suggest practical recommendations:
  Give recommendations on concrete steps that educators and industry stakeholders could take to close the gaps in skills, resources, and systematic training.

1.5 Scope and Limitations

The research scope is limited to undergraduate students of the MCT department at DIU regarding their experiences and preferences of the 3D modeling software. Quantitative data were collected from 240 students, representing 20% of the MCT department at DIU, on choices, challenges, and aspirations.

However, this study has a number of limitations:

1. **Sample Size and Representation:** The results may not reflect the full depth of variation that exists within the larger population of DIU students or the global game development community.
2. **Cultural and geographical context:** This research is couched within DIU in Bangladesh; its results might, therefore, have very limited generalization for regions that have different economic and/or cultural dynamics.
3. **Self-reported data:** The reliance on self-reported survey data provides the risk of biases, such as social desirability bias or misunderstanding of technical terms.

Despite these limitations, the study provides a localized view that is important to the development of educational programs and resources responsive to the needs of multimedia professionals in Bangladesh.

CHAPTER 2

Literature Review

Whether commercial or open-source, the game engine is an essential building block of the video game industry, with many tools and features necessary for implementing a game. Important factors governing the choice of the game engine include compatibility with a platform, the scripting language, and the efficiency of handling computational resources. Each one of the most well-known game engines-Unity3D, Unreal Engine 4, Panda3D, and others-offers its unique advantages and limitations. Unity3D is generally known for its versatility and vast asset store, while Unreal Engine 4 has been a leading platform in terms of high-fidelity graphics rendering. Panda3D, being less famous, is preferred for educational projects and lightweight game development, which shows the importance of choosing an engine with care and targeting specific project needs [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 framework promotes collaboration, thereby preparing students for the realities of professional game development. Emphasizing collaboration and integration across disciplines, the 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 integral to modern game development, bridging the gap between artistic creativity and technical precision. It allows developers to create characters, environments, and objects that are both visually stimulating and functionally integrated into the gameplay mechanics.

3D modeling technology has enhanced realism and immersion in games from sculpting, retopology, and procedural texturing. It will be essential with tools like Blender and Autodesk Maya, which enable developers to create very detailed and dynamic assets. With the growth in the gaming industry, the demand for efficient 3D artists and modelers is huge. This spurs innovative development concerning 3D modeling technologies: real-time rendering, automated modeling, and even very sophisticated simulation. Such advances help developers remain focused on creative storytelling and gameplay while their technical asset integrity is taken care of.

2.2 Key Features of Popular 3D Modeling Software

For developers, 3D modeling software is crucial as it influences their productivity, creativity, and final output quality. Following are some of the most used industry tools:

Autodesk Maya

- Maya is a pro's ecstasy, renowned for powerful animation and rigging tools.
- It offers a very friendly interface and a rich library of plugins, making it appropriate for modeling various assets.
- UV mapping, advanced simulation, and integrated rendering make it desirable for high-end game development.

Blender

- Being open-source makes Blender accessible for independent developers and students.
- It offers the full gamut of modeling, sculpting, texturing, and animation but with strong user customization over the UI.
- This includes an integrated game engine and real-time rendering capabilities, making it more financially friendly to use compared to commercial software.

3ds Max

- It is favored for its accuracy in architectural visualization and game environment modeling.
- It has various tools for procedural animation, realistic physics, and high-quality rendering.

ZBrush

- It specializes in digital sculpting, hence doing great in creating detailed works for characters and creatures.
- It works well with other programs like Maya and Blender to provide a seamless workflow.

2.3 Previous Studies on Software Preferences

Previous research has indicated that usability, cost, and accessibility are the major factors influencing developers' preferences for 3D modeling software. This can be represented as follows:

The trend of Adoption: Autodesk Maya is always chosen for professional purposes because of its high-end functionality, while Blender finds its place among students and independent developers due to its open-source and low-cost nature.

Difficulties: One study found that 18% of the interviewed subjects could not orient themselves in software interfaces, while 10.9% reported problems when modeling complicated objects. These results show the necessity for beginners to make interfaces as friendly as possible and provide extensive tutorials.

Lack of Formal Training: The reliance on self-taught methods is a recurring theme, with 83.3% of participants in one recent survey reporting no formal training in 3D modeling. This underlines the importance of structured learning programs to help bridge the skill gap.

Creative Roles Most Wanted: Creative roles, including 3D artistry and environment design, are the first choice for 40% of the aspirants. This is aligned with the use of tools for creativity and visual storytelling.

2.4 Gaps in the Existing Literature

While existing literature provides the base for foundational knowledge, some areas are not well explored. For example:

Specific Population Focus:

Most of the literature lacks detailed information on the preferences and challenges of specific groups, such as undergraduate students in multimedia and creative technology programs.

In-depth Analysis of Influencing Factors:

Seldom is attention paid to the 'why' behind the preference for a tool such as Autodesk Maya or Blender. Key factors include prioritization of features, cost, and accessibility.

Underrepresentation of Developing Regions:

Research is often concentrated in developed countries, overlooking the unique challenges faced by students and developers in regions like Bangladesh.

Training Gaps:

While the lack of formal training is acknowledged, little is discussed on effective pedagogical strategies for teaching 3D modeling to beginners.

Addressing Usability Issues:

lthough interface complexity is identified as a challenge, there are few practical recommendations for improving usability in 3D modeling software.

This study aims to address these gaps by focusing on the specific needs of DIU MCT undergraduates in Bangladesh, providing localized insights and actionable recommendations for improving tools, training, and resources.

CHAPTER 3
Methodology

The qualitative research paradigm was used to understand the preferences, experiences, and challenges of aspirant multimedia professionals about 3D modeling software in mobile game development. Demographic information, such as age, gender, and occupation, was elicited alongside subjective information on their preference for the software, problems encountered, and their suggestions. The research aims at key areas such as preferred 3D modeling software used by participants, challenges, and goals-wanting to work in larger game development teams.

This helps answer practical questions regarding software preference and provides valuable insights to students, educators, and software developers. The sample population has been 240 responses from the DIU MCT current students and alumni, which is approximately 20% of the total population of 1,270. The limitation of the sample size might reduce the broader applicability since the sample size may not be fully representative of the diverse variation in the total population, and thus the results cannot be generalized.

3.1 Research Design and Approach

The research adopts a qualitative approach to understanding the preferences, challenges, and aspirations of undergraduate students regarding 3D modeling software for mobile game development. It uses a descriptive research design to determine the tools that the students most prefer, the factors that influence their choices, and the barriers they face in mastering 3D modeling.

A survey-based methodology was used to collect data from students of the Department of Multimedia and Creative Technology, Daffodil International University, Bangladesh. The study will focus on interpreting qualitative data, such as demographics, software preferences, and perceived advantages and challenges of the different tools. This method's approach ensures comprehensiveness in analyzing the research questions.

3.2 Population and Sample Description

The target population in this research involves undergraduate students enrolled in the MCT department at DIU. This is because the same department offers specialised programs, including multimedia, animation, and game design, making its student's ideal participants for research related to 3D modeling software preference.

Sample Size and Selection:

The sample population used was 240, representing about 20% of the Department of Computer Studies population, with approximately 1,270 students. These students are interested in developing mobile games with experience using 3D Modeling software selected through a purposeful sampling approach.

Demographics:

Descriptive data was also collected on the gender, age, and academic standing of respondents. A significant portion Of the sample, 74.5% of the respondents described themselves as male, while 25.5% described themselves as female.

While the sample is representative of the MCT department, it does not fully capture the diversity of students within the broader university or other institutions.

3.3 Data Collection Tools (Survey Design)

It includes using a structured survey to assess students' experiences and preferences regarding 3D modeling software. That is why I created 24 questions and divided them into three parts: Personal Profile, Gaming Enthusiast & Developer Insights, and Technical Tools and Feedback.

Personal Profile Questions:

- Your Full Name
- For research purposes, if our team members want to communicate with you, which of the following modes would you prefer?
- Your Cell Phone Number (Optional)

- Please Specify Your Gender
- Which of the following age clusters perfectly describe you?
- Which of the following roles perfectly describe you?
- If you are a student, please write the name of your institution.
- If you are a job holder, please write the name of your organization.
- If you are a job holder, please specify your role in the organization (e.g., Graphic Designer).

Those nine questions are essential to understanding the participants' demographics and their preferred communication methods. Asking for the participant's name, contact preference, gender, and age cluster helps us classify and categorize responses to help target specific groups for data analysis. Apart from that, this section talks about the educational or professional background of the participant, namely, the institution to which they belong or the organization they work for and their designation. This would help filter responses according to their position or educational background and give more valuable insights into their view on the development of mobile games.

Gaming Enthusiast & Developer Insights Questions:

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

In those seven questions, we find the participant's interest in mobile gaming and game development, apart from professional training and experience. We ask if people are into

mobile game development or have any formal training since this will provide expertise-related data. We also ask about their preferred roles in a game development team and how long they have been active in the field. This section is important to understand the level of experience and passion for game development among the participants.

Technical Tools and Feedback:

- Which 3D software do you prefer for asset development in your game development project?
- What type of mobile game would you like to pick as your initial/first game development project?
- Which of the following challenges are you facing while using the software of choice for your game development project?
- Which of the following advantages are you getting while using the software of choice for your game development project?
- 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.)
- What is the model and brand name of your cell phone? (e.g., Samsung S24 Ultra)
- From when are you using your current cell phone? (e.g., December 2023)
- What is the model and brand name of your previous cell phone?

Those eight questions reflect the emphasis on creating mobile games on the preferred software for 3D modeling. It will find out what software the participants prefer and what kind of mobile games they would want to develop. It also talks about the problems they encounter and the advantages they experience from using specific software. Feedback is essential, so suggestions are asked from the participants as to how their preferred software can be improved in future versions. Finally, this section asks about models of mobile phones the participant uses and has ever used to help us understand whether or not the device has any relevance to their gaming or development experience.

Structure of the Survey:

Demographics: Age, gender, and academic background.

Software Preferences: Type of 3D modeling software used, including but not limited to Autodesk Maya and Blender, and the motives behind the choice.

Challenges: Items range from questions about difficulties with learning or using 3D modeling tools, such as interface complexity and modeling intricate objects.

Training and Skill Development: Items range from questions about formal training, self-learning methods, and preferred lengths for workshops or courses.

Professional Aspirations: Items range from questions about career interests in game development roles, such as 3D artistry, animation, or technical programming.

Survey Administration: The survey was taken offline to ensure ease of participation and accessibility for students across different schedules. Tools such as Google Forms were used for data collection, facilitating the organization and analysis of responses. Data were collected from individual students in various classes with the assistance of their respective instructors using Google Forms.

3.4 Data Analysis Methods

The survey data was used to understand the participants' preferences, challenges, and experiences with 3D modeling software. This mixed-method approach allowed for an in-depth review of the numerical trends while collecting subtle insights from open-ended responses.

Descriptive Statistics:

Quantitative data, such as demographic information, preferred software, and challenges faced, were analyzed using descriptive statistical methods. Frequencies and percentages were calculated to show how the participants responded to specific questions. These were good starting points for the general trends in the dataset. The findings have been

represented in pie charts and bar graphs for easy comprehension, and the graphical presentation tools were extensively used to present the findings. They summarized the data well and focused on the derived key points, such as the most favored software and the most reported challenges from respondents.

Thematic Analysis:

Qualitative data analysis from open-ended survey responses was done using the thematic analysis approach. This comprised identifying, coding, categorizing, and analyzing patterns and themes in the text. Responses, for example, shed light on the basis upon which such decisions were made regarding the software selection, touching on themes such as usability, affordability, and richness of functionality. In addition, the thematic analysis uncovered participant suggestions for enhancements: ease of interfaces or additional training. This approach gave an insight into the standpoints of participants and complemented the quantitative results.

Cross-tabulation:

Cross-tabulation was used further to enrich the analysis of relationships among variables. For example, the relationship between formal training and increased working skills for various 3D modeling software was studied. This method helped identify trends as to whether the participants with formal training demonstrated greater competency in using advanced features compared to self-taught ones.

Finally, the findings were related to the literature for background understanding. This allowed for identifying areas where findings matched or deviated from prior findings and provided an understanding of how this study added to the literature regarding 3D modeling software preference and challenges.

3.5 Ethical Considerations

Ethical considerations were carefully upheld in this research. To ensure each respondent's integrity, credibility, and participant rights. Informed consent was at the forefront of every step of this research. This research's objectives, purpose, and procedures were clearly explained to potential participants. Participation was purely voluntary, and anyone

could withdraw from participating at any moment without facing further consequences. Informed consent: Detailed explanations regarding the nature of the data to be collected and how these would be used were provided, after which consent to take part was sought. Anonymity and confidentiality were strictly maintained in this study.

All data were anonymized to prevent tracing back from specific data to particular individuals. Personal information collected, such as demographic data, was well-kept and accessible to authorized researchers only. The participants were assured of the confidentiality of their data for the research only and not to be shared in a way that would breach their privacy. This commitment to confidentiality fostered a sense of trust, encouraging honest and open responses. To practice non-maleficence, the research study was designed not to cause harm to participants. It has been designed not to touch sensitive areas of the respondents or even potentially distressing topics.

The questions were phrased respectfully and did not invade any private areas, focusing on preferences and challenges about 3D modeling software, thereby avoiding any potential discomfort or embarrassment. They were also provided with the research team's contact information should they need clarification or have an issue with the research process. The study was founded on ethical standards, ensuring the result was credible and reliable. Data management was done carefully to ensure accuracy in analysis. Data was not falsified or manipulated, and results were represented honestly and transparently.

It also credited other researchers' works by accurately referencing all references and theoretical frameworks. This adherence to strict academic standards underlined the reliability of the research and further enhanced its credibility. Overall, the research respected participants' autonomy, transparency, and equity. This study secured participants ' dignity, rights, and well-being by focusing on ethical factors like informed consent, confidentiality, non-maleficence, and academic integrity. Implementing these measures increases the credibility of such findings and provides a framework within which research is ethical and respectful.

CHAPTER 4
Result

The study surveyed 240 undergraduate students from the Department of Multimedia and Creative Technology (MCT) at Daffodil International University (DIU). The respondents were predominantly male (74.5%), with most aged between 18 and 24 years (89.1%), a demographic commonly associated with emerging talent in mobile game development. 84.5% were interested in playing mobile games, and 62.8% wanted to develop mobile games, proving strong potential in this field. However, 37.2% did not want to professionally develop games, which showed individuality in their career choices.

Notably, the respondents were never formally trained; 83.3% identified that they had to self-train through online tutorials or other resources within the community. Only 16.7% of those interviewed reported professional training; 32% had training for less than one month. This reliance on informal learning indicates an excellent demand for more accessible, structured training opportunities.

Almost 40% wanted creative roles in a game development team, such as 3D Artist or Environment Artist. Then came UI/UX Design with 14.2%, while the interest in the technical roles was moderate: Engine Programming and Animation. The least favorite choices included managerial roles and Sound Design, which implies that creative/design-oriented tasks are preferred over purely technical or administrative ones. Besides, 92% of them had never developed a mobile game, meaning fundamental education is in great demand within this field.

About 3D modeling software preferences, Autodesk Maya was the most preferred, at 48.1%, followed by Blender, at 17.2%. Factors influencing these choices included features, cost, ease of use, and market relevance. Maya was preferred due to its significant number of tools and professional usage, while students loved Blender as it is free and open-sourced. However, 16.3% claimed not to know any 3D modeling software, which means the knowledge gap is present in this cohort.

The challenges in the use of 3D modeling tools were also immense. Many respondents, 20.1%, cited unfamiliarity with the software, while 18.0% found the interfaces challenging to navigate. Resource limitations, such as high licensing costs and hardware requirements, further compounded these difficulties. Despite this, participants noted several benefits, including powerful modeling capabilities at 17.2%, high-quality rendering, and smooth integration with game engines.

Action games were the most common first development projects, at 33.9%, followed by puzzle and strategy games. This suggests a strong interest in creative roles and mobile game development and the need for formal training and accessible resources to address skill and knowledge gaps.

4.1 Demographic Profile of Respondents

The study surveyed 240 undergraduate students from the Department of Multimedia and Creative Technology (MCT) at Daffodil International University (DIU), Bangladesh. The demographic distribution includes:

Figure 4.1: Gender Distribution of Respondents.

The pie chart illustrates the gender distribution of participants who answered, "Please specify your gender?" The data presented shows that 74.5% of respondents identified as Male, representing most of the participants in this survey. 25.5% of respondents identified as Female, constituting a smaller portion of the surveyed group.

Age 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.

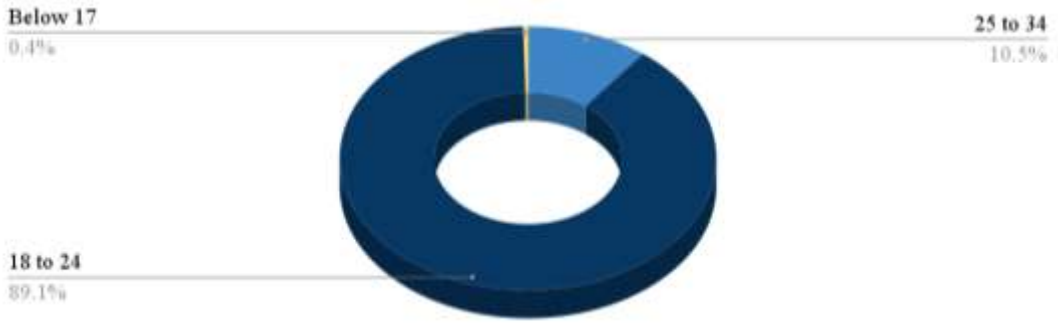

Figure 4.2: Age Distribution of Respondents.

It encompasses age groups of between 18 and 24 years for 89.1% of the participants, while 10.5% lie in the 25 to 34 years bracket, that is, between early and mid-career. Below 17 contributes a meager fraction, only 0.4%, showing very limited participation from younger respondents.

Interest in Mobile Games:

A significant majority (84.5%) expressed interest in playing mobile games, reflecting the pervasive appeal of mobile gaming. This interest also translates into enthusiasm for mobile game development, with 62.8% of respondents showing a desire to engage in the field.

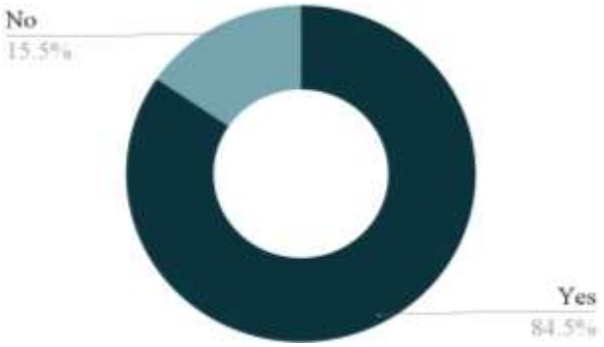

Figure 4.3: Respondents are interested in playing mobile games.

Firstly, the researchers are the respondents, and they are asked whether the respondents are interested in playing mobile games or not. “Are you interested in playing mobile

games?"[19]. The pie chart stated in Figure 4.3 illustrates the distribution of interest in playing mobile games among the participants who participated in the survey. There is significant interest in mobile gaming among the surveyed participants. 84.5% of respondents expressed interest in playing mobile games, reflecting the broad appeal and widespread engagement with this form of entertainment. In contrast, only 15.5% indicated no interest, signifying that the segment of people not engaged in mobile gaming is relatively tiny.

Figure 4.4: Interest in Mobile Game Development of respondents expressed interest.

In the research of (Ariff M. et al., 2020), he asked the same type of question to find out the result. The science of this research aligns with or falls into the same domain, which is why we have chosen to put this question on this survey "Are you interested in developing mobile games?"[20]. The pie chart illustrates the responses a majority of the respondents Figure 4.4: Interest in mobile game development, 62.8%, expressed an interest in creating mobile games, showcasing a strong enthusiasm for engaging in game development. On the other hand, 37.2% of the participants indicated that they are not interested in developing mobile games.

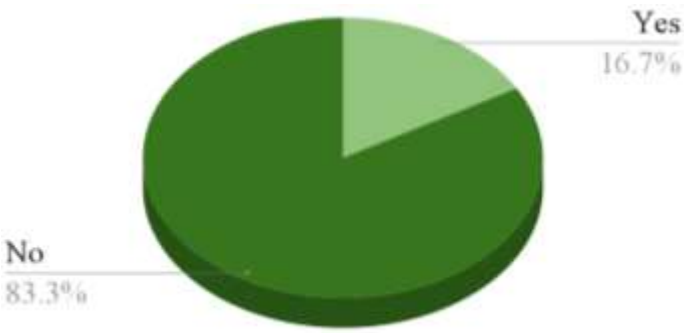

Figure 4.5: Game Development professional training graph.

Pie chart showing the answers to the survey question "Have you received any professional training in game development?"[21] is shown in Figure: 4.5. According to the data, only 16.7% of participants said they had gotten formal training in game creation, whilst a huge 83.3% of participants said they had not. Pie chart emphasizes a crucial component of skill development in the game development industry. Given the significant proportion of people without professional training, it is likely that many aspiring or working game developers are self-taught and frequently rely on unofficial learning strategies like online courses, resources, or cooperative community activities.

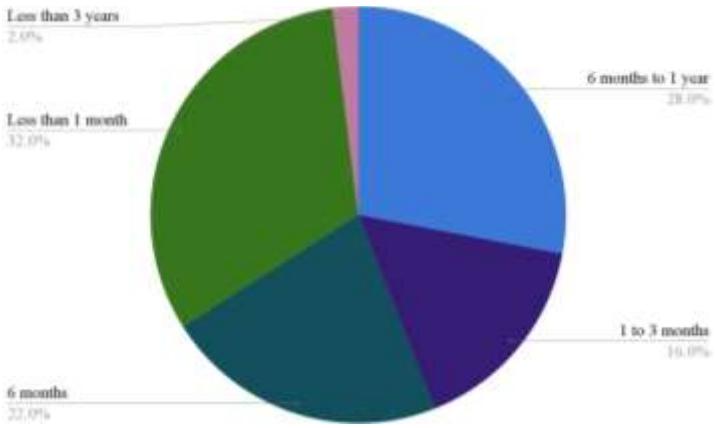

Figure 4.6: Duration of Professional Training in Game Development Among Participants.

This pie chart depicts the distribution of responses regarding the duration of training periods for individuals who answered "Yes" to a prior question is shown in Figure: 4.6. The data reveals that most training programs are short-term, with 32% of respondents indicating less than 1 month training period. Additionally, 16% reported a duration of 1

to 3 months, highlighting a significant preference for shorter training sessions. Mid-term training programs are also standard, with 22% of respondents undergoing 6-month training and 28% indicating training durations of 6 months to 1 year. In contrast, long-term training is rare, as only 2% reported less than 3 years.

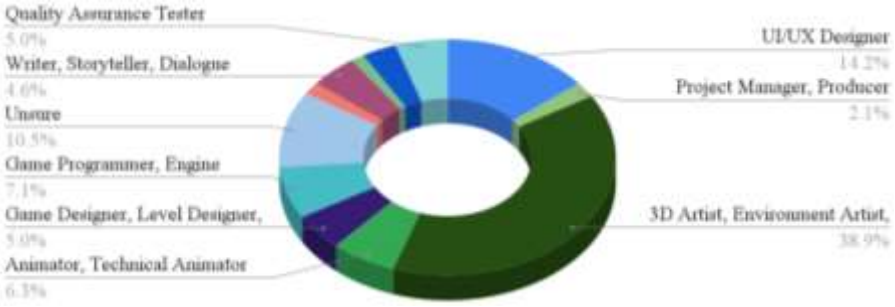

Figure 4.7: Preferred Roles in a Large Game Development Team: Participant Insights.

Figure: 4.7 shows several essential findings on the job: "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 roles dominate the preferences, with nearly 40% of respondents aspiring to work as 3D Artists or Environment Artists. A significant portion also shows interest in UI/UX Design, which accounts for 14.2% of the responses. Technical roles, such as Engine Programming (7.1%) and Animation (6.3%), hold moderate appeal, reflecting their importance in game development. However, roles like Project Management (2.1%) and Sound Design (1.7%) are less popular, suggesting these areas require more targeted recruitment efforts or increased awareness of their value. Interestingly, 10.5% of respondents were unsure about their preferred role, indicating a potential need for career guidance or exposure to the various opportunities available in the game development industry. The chart emphasizes the popularity of creative and design-oriented roles, while technical and managerial roles show comparatively lower interest.

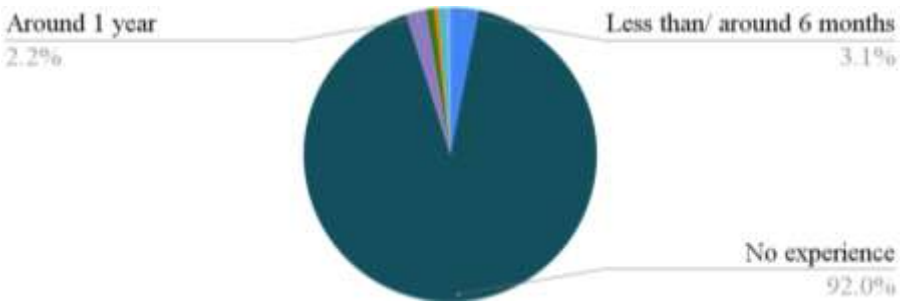

Figure 4.8: Experience Levels in Mobile Game Development among Participants.

The distribution of respondents according to their " How many years of experience do you have in mobile game development?"[13] is shown Figure: 4.8. The vast majority of participants are novices or new to mobile game creation, as seen by the overwhelming 92% who said they had no previous experience in this industry. Only a small portion of respondents possessed some experience; 3.1% reported having less than or about six months' experience, 2.2% had one year or more, and only 0.9% had two years or more. These results emphasize the dominance of novices in mobile game creation by showing that experienced respondents make up a relatively small portion of the sample.

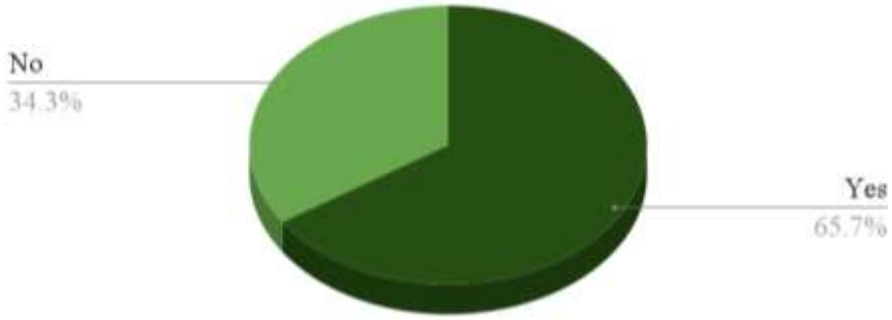

Figure 4.9: Differences Between Game Engines and 3D Modeling Software.

This pie chart depicts the respondents' understanding of “Do you know the differences between game engine and 3D modeling software?” [22]. It is shown above in Figure:4.9. There are 65.7% of respondents said they know the differences, demonstrating a strong foundation of experience in this field. However, almost one-third of the participants have a knowledge gap, as 34.3% said they are unaware of the differences.

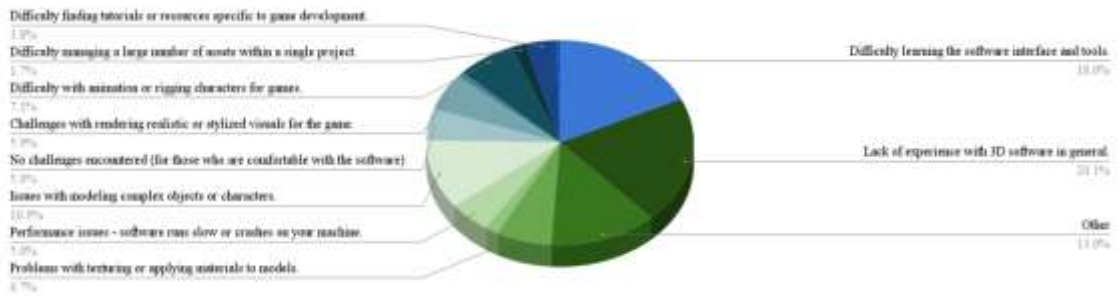

Figure 4.10: Challenges Faced While Using 3D Software for Game Development Projects

The pie chart "Which of the following challenges are you facing while using the software of choice for your game development project?"[23]is depicted in Figure:4.10. According to 20.1% of respondents, the biggest obstacle is a general lack of knowledge with 3D software. Subsequently, 18.0% of respondents reported having trouble grasping the program interface and functionality. Problems in modeling complicated objects or characters make up 10.9%, while other obstacles make up 13.0%. 7.1% of respondents said they had trouble animating or rigging characters, while 6.7% said they had trouble texturing or adding materials to models. 5.9% of respondents said they had trouble creating realistic or stylized images, while 5.0% said they had no problems at all.

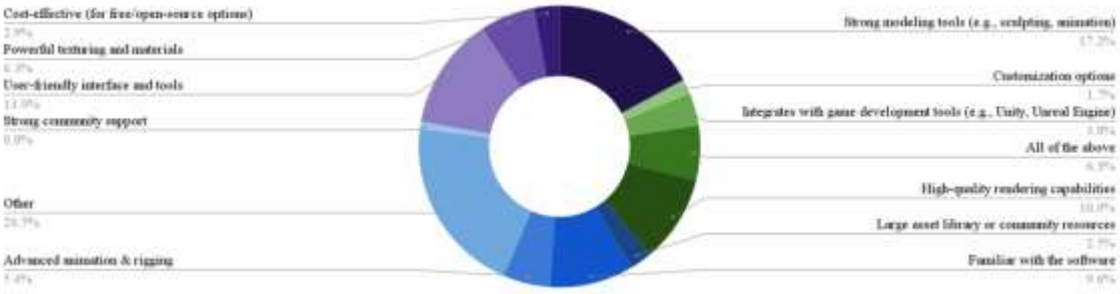

Figure 4.11: Advantages of Using 3D Software for Game Development Projects.

The benefits that respondents " Which of the following advantages you are getting while using the software of choice for your game development project? " [23] in the Figure: 4.11. With 17.2% of respondents choosing it, powerful modeling capabilities (such as sculpting and animation) are the most often mentioned benefit. Tools and an easy-to-use interface come in second at 13.0%, while "other" benefits make up 20.5%. 10.0% mention high-quality rendering capabilities, and 9.6% say knowing the software is

advantageous. 6.3% mention powerful texturing and materials, while 3.8% mention integration with game production tools like Unity and Unreal Engine. Strong community support is the least mentioned benefit at 0.8%, customization choices are mentioned by 1.7%, and cost-effectiveness (for free/open-source solutions) is mentioned by 2.9%.

These data highlights that while a considerable portion of people are inclined toward game development, a significant minority remains uninterested. This may point to factors such as lack of technical skills, resources, or personal preferences for other creative or professional pursuits. It underscores the potential for growth in this area, especially with training or incentives for those considering entering the field.

4.2 Most Preferred Software

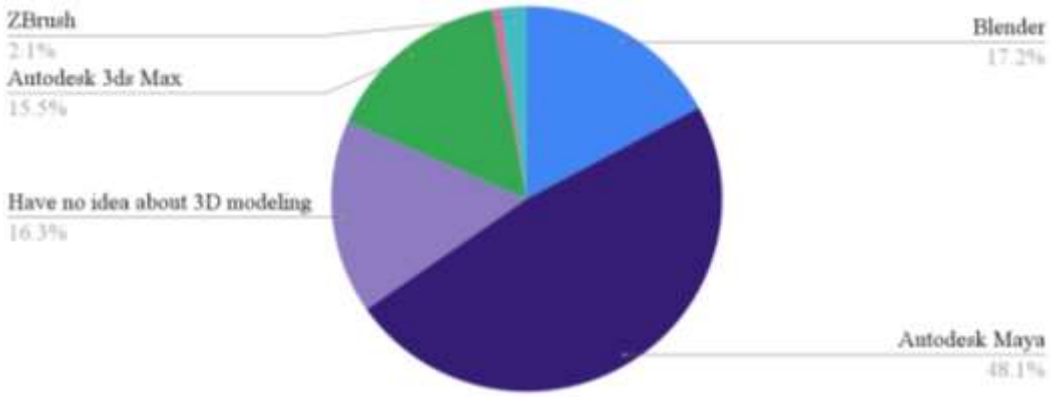

Figure 4.12: 3D Modeling Software Among Respondents in Game Development Projects**.**

Figure 4.12 shows the preferences of the respondents for "Which 3D software do you prefer for asset development in your game development project?"[24]. Autodesk Maya is the most preferred one, as 48.1% of the respondents chose this. In runners-up, blender got 17.2% of the respondents' preference, while 16.3% stated that they knew nothing about 3D modeling. The last one is ZBrush, which was chosen by only 2.1% of the respondents, while Autodesk 3ds Max covers 15.5% of the preferences.

4.2.1 Factors Influencing Preferences

Various factors were identified to influence the choice of 3D modeling software by participants.

Features and Functionality: Tools like Maya and Blender were preferred for their feature sets, which included sculpting, rigging, texturing, and rendering capabilities. The participants valued software that could handle diverse asset creation needs.

Accessibility and Cost: Where Blender's free, open-source model was especially attractive to students, the cost of Autodesk products made it inaccessible to anybody without institutional support.

Usability and Learning Curve: It was also much easier to use. While Maya was a professional tool in many ways, it was dauntingly complex for a beginning student; the customizability of Blender helped to make up for some usability challenges.

Community Support and Resources: A large active user community, comprehensive online tutorials and forums were also an advantage of these systems, as they helped participants overcome their learning difficulties.

Professional Alignment: Industry alignment was also considered as a major factor for many participants. Maya was considered more appropriate by those participants who wanted to enter game development studios.

4.3Challenges in using 3D Modeling Software

Participants mentioned difficulties working with 3D modeling programs and indicated that the learning curve was steep, with very few training opportunities. As many as 83.3% of the participants reported no formal training but rather self-learning and informal resources, which limit their possibilities of developing professional skills.

The other big challenge was navigating the software's interface and functionality; because of its complexity, 18.0% of participants could not adapt, especially beginners. Further, 10.9% reported difficulty modeling complicated objects or characters, showing that this can only be achieved with specialized training.

The students' use of these programs was further constrained by resource issues, including high software license costs and the higher hardware requirements of more advanced

programs like Autodesk Maya. Specific technical challenges, such as texturing, rigging, and animating characters, were also reported by smaller subgroups of respondents, which again signaled points of incomplete technical competencies. These findings point to a need for accessible training and resources that would help in overcoming these barriers effectively.

4.4 Advantages of using 3D Modeling Software

Despite the difficulties, some advantages of using 3D modeling software in game development were found.

1. Powerful Modeling Capabilities: Maya and Blender were found to be very useful because they had various features such as sculpting and animation; 17.2% of the participants named this advantage.

2. Better Creativity: This ability to create unique and appealing assets was considered one of the major motivators for respondents, especially those with interests in creative roles related to 3D artistry and environment design.

3. Integration with Game Engines: Most respondents stated that 3D modeling tools integrate well with widely used game engine like Unity and Unreal Engine, which smoothen the development pipeline.

4. High-Quality Rendering: Advanced rendering capabilities of the tools were preferred for creating professional-grade assets.

5. Community Support: The extensive online tutorials, forums, and plugins were instrumental in helping participants get through the learning challenges.

4.5 Trends in Mobile Game Development among Respondent

The research found many interesting trends in the sphere of mobile game development among the DIU MCT undergraduate population. Most of the respondents, 62.8%, were interested in developing games for mobile platforms, representing extremely high enthusiasm within the field. From the creative viewpoint, the subjects were much

interested in 3D artists and environment designers; 40% wish to pursue a career that is visually involved in game development**.**

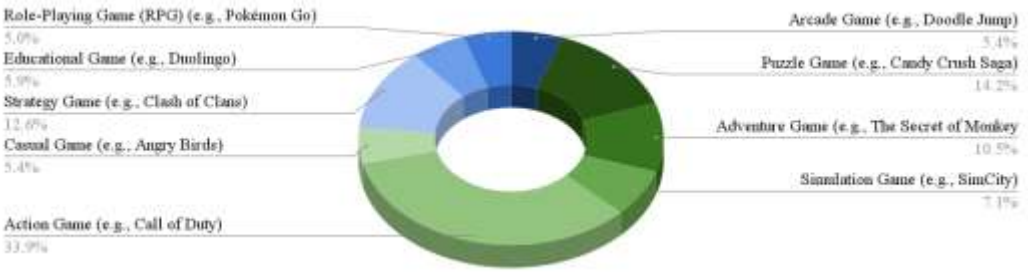

Figure 4.13: Displaying Preferences for Initial Mobile Game Development Projects**.**

"What type of mobile game you would like to pick as your initial/first game development project?"[25] is depicted in Figure: 10. The most popular genre is Action Games, taking 33.9% of the choices and being thus the very favorite when it comes to an initial project. This is followed by Puzzle Games, reaching 14.2%, and Strategy Games, reaching 12.6%, showing great interest in games where a player has to solve some kind of problem or use some tactics. Fourth place goes to Adventure Games, like The Secret of Monkey Island, enjoying a popularity rating of 10.5%, thus being quite potent. Further down the line, Simulation Games such as SimCity came in at 7.1%, while Educational Games and Casual Games had 5.9% and 5.4% of the choices, respectively. Arcade Games like Doodle Jump are also answered with 5.4%. Only 5.0% chose Role-Playing Games (RPG) as their favourite genre. Examples were Pokemon Go.

CHAPTER 5

Discussion

The research has thoroughly examined the preferences, challenges, and aspirations of DIU MCT undergraduates when it comes to choosing 3D modeling software for mobile game design. The results reflect worldwide trends and provide important perspectives within the context of Bangladesh.

The research identifies Autodesk Maya as the most preferred software, chosen by 48.1% of participants due to its advanced animation, rendering features, and alignment with industry standards. Among these, Blender stands out at 17.2%, offering a good alternative, mainly because it is affordable, open-sourced, and with very active communities. Other software, such as 3ds Max and ZBrush, has special uses, including architectural modeling and digital sculpting. This shows attention to industry-standard software and more accessible alternatives. Key factors influencing these preferences include usability, affordability, and features. Maya's professional-level tools help students who wish to meet industrial standards, but the steep interface and licensing costs are a deterrent. Being open-sourced and regularly updated, Blender fits perfectly for students on a tight budget. Difficulties highlighted include steep learning curves, difficulty navigating interfaces, and modeling complex objects, at 18% and 10.9%, respectively, pointing to the need for more accessible and intuitive tools.

The lack of formal training is a serious issue, while 83.3% of students rely on self-learning through online tutorials. However, these flexible tracks often lead to fragmented understanding and skill gaps. Financial constraints aggravate the problem and limit access to licensed software and other necessary resources.

Suggestions for this include incorporating formal training programs into the curriculum, starting from beginner to advanced classes, and holding specific workshops on practical challenges. Industry collaborations can offer students licensed software, mentors, and

real-world workflows. Software providers should provide educational licenses and develop more novice-friendly interfaces.

5.1 Interpretation of Results in Light of Objectives

The research tried to identify DIU MCT undergraduates' preferences, problems, and expectations regarding the 3D modeling software used in mobile game development. Findings illuminate these aspects, which align with this study's objectives and can be useful for educators and industry stakeholders.

Objective 1: Identify the Most Preferred 3D Modeling Software

The investigation shows that Autodesk Maya is the most popular 3D modeling tool among students, as 48.1% of the respondents chose it as their main one. Such dominance reflects Maya's status as professional-level software with advanced features, satisfying almost all game development needs: complex animation and rigging, smooth rendering options, and extensive plugin support make it an industry standard for game developers.

Blender, the second choice of 17.2% of the participants, is a significant alternative, adding that this open-source software is free. The rich functionality of Blender makes this tool particularly attractive for students and independent developers with tight budgets. Community support for Blender has grown, and updates are frequent; these factors have increased its ease of use, further cementing Blender's position within academic and amateur usage.

Other tool preferences were for 3ds Max at 15.5% and ZBrush at 2.1%, showing specific needs in the student population. For instance, 3ds Max is chosen for its precision in modeling architectural environments, while ZBrush is generally chosen for its excellent skills in digital sculpting for detailed characters and organic forms. These findings have shown the broad eventual uses of the 3D modeling software and different requirements by students based on their career destinations.

Objective 2: Factors Affecting Software Preference

The following factors influence students' preference for specific software: usability, affordability, and richness of functionality.

Usability: Game development projects generally use Maya because of its friendly interface and well-organized workflow. However, 18% of respondents complained about the interface's difficulty, and 10.9% showed their dissatisfaction with modeling complicated objects, which requires a balance between functionality and ease of use.

Affordability: Blender's popularity supports the fact that affordability is one key factor, particularly for students with no access to financial resources. Its open-source model allows students to explore professional-grade tools without the burden of expensive licenses, making it very appealing for beginners.

Features: The adoption of Maya and Blender can be explained by their advanced capabilities. Maya's advanced animation and rendering features meet the requirements for professional game development, while Blender satisfies the most varied creative and technical needs.

Objective 3: Challenges Faced by Students

The lack of formal training was the major problem for the DIU MCT undergraduates, as 83.3% of the respondents depended on self-taught methods. Such an informal learning pathway usually leads to fragmented understanding and inefficiency in mastering complex software.

Specifically, students reported that the following were some of the challenges:

- **Navigating Software Interfaces:** Most students struggle with the complexity of professional tools. For example, 18% of the responses mentioned significant interface navigation issues.
- **Modeling Complex Objects:** Similarly, 10.9% of participants indicated difficulties with creating realistic-looking detailed assets, reflecting gaps in technical proficiency. The restricted availability of licensed software and

hardware further aggravates these issues by preventing the students from fully using the tools at their disposal.

Objective 4: Recommendations to Improve

Suggested recommendations that might help resolve these gaps and issues identified in the next course of development include:

Formal Training Programmers:

All academic programs at institutions need to incorporate comprehensive, professional training classes about 3D modeling application software. Sessions must be targeted. Courses are offered at beginner, middle, and expert stages and encompass many subjects.

Industrial Partnerships:

This collaboration will provide university students with licensed software, mentorship opportunities, and real-world projects from industry stakeholders. It will also bridge resource limitations and expose the students to professional workflows.

Short-term Workshops:

Workshops on both beginner-friendly techniques and advanced functionalities could be provided on specific challenges that students face, such as navigation within an interface and object modeling. When very specialized, these sessions significantly improve the student's proficiency and confidence in using 3D modeling tools.

Ease of Access:

Software providers shall provide educational licenses or discounts to students so as not to inhibit learning with economic barriers.

5.2 Alignment with Existing Literature

These findings align with those obtained from various international studies while providing specific insights into the experiences of DIU MCT undergraduates. Researching students' preferences, challenges, and aspirations in Bangladesh adds a new dimension to the 3D modeling and game development literature.

5.2.1 **Software Preferences and Adoption**

The preference of Autodesk Maya and Blender among the DIU MCT students reflects established world patterns in using 3D modeling software. Autodesk Maya is widely recognized for its broad feature set, including advanced animation, rigging, and rendering capabilities, and was chosen by 48.1% of the participants. This aligns with industry research that shows Maya as the go-to software for professional game developers due to its flexibility and handling of complex projects.

Similarly, Blender's popularity stands at 17.2%, indicating its adoption due to its being free and open-source. Research indicates Blender democratizes access to high-quality 3D modeling, especially for students and indie developers on a tight budget. The fact that Blender is open-source and enjoys excellent community support already puts it in a favorable position among those who need an affordable solution without compromising on important features.

This might demonstrate students' pragmatic choices when selecting tools in Bangladeshi schools. On the one hand, open-source tool choices like Blender reveal budget limitations. On the other hand, Maya's high ranking expresses students' ambitions toward industrial-grade criteria. This finding reveals a demand for a multi-perspective curriculum that includes courses on professional grades and easily accessible tools.

5.2.2 Difficulties of Learning and Utilization

The difficulties the DIU MCT students face working with 3D modeling software testify to some global trends in education and training. A fair number of respondents reported difficulties with software interfaces (18% of the time) or when trying to model complex objects (10.9%). These findings are consistent with studies identifying steep learning curves and technical complexity of professional tools among common challenges beginners face.

In that aspect, 83.3% of the participants mentioned that such reliance on self-directed learning methods reflects global trends where aspiring developers often use online

tutorials and community discussions as informal education sources in their development journeys. While offering flexibility, many channels lack the organized guidance for advanced software mastering. This correlates with research underlining the complementary role of formal training in filling gaps within technical competencies.

In Bangladesh, students' access to licensed software and advanced training is limited, adding to the problem. A general shortage of affordable resources makes the preference for open-source tools like Blender not just a preference but a compulsion. Solutions to these challenges require specific strategies in terms of educational licenses and user-friendly interfaces for novices.

5.2.3 Interest in Creative Roles

The strong interest of DIU MCT students in creative positions, such as 3D artistry and environment design, corresponds with global trends that showcase the appeal of visually captivating and artistic careers within the gaming sector. Approximately 40% of the respondents were interested in those roles, reflecting the universal fascination with creativity and storytelling in game development.

This observation aligns with research emphasizing the significance of cultivating artistic abilities alongside technical knowledge. Creative roles like 3D artistry require proficiency in tools like Maya and Blender and a thorough understanding of design principles, color theory, and spatial visualization. By prioritizing these positions, students clearly envision their career trajectories, highlighting the need for specialized training programs that develop technical and creative skills.

This interest has been a massive opportunity for educational institutions and industry participants to invest in creative education in Bangladesh. Educators should encourage such collaborations with professional game studios, teaching students the key skills to occupy these roles.

5.2.4 Localized Insights

Although these findings are consistent with international research, they also reveal a fine-grained view of the specific challenges and opportunities that students in the Bangladeshi

context face. The financial imperatives that underpin the adoption of Blender, the reliance on informal channels to learn, and the strong career aspirations all testify to a particular situation that is not amenable to one-size-fits-all solutions.

The study contributes to the extant literature by reiterating that accessibility, ease of use, and affordability are the major reasons influencing the choice of software among students in developing regions. It also clearly calls for tailored interventions that take into account the prevailing specific circumstances among such 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 study emphasises critical recommendations for educators and the game development industry to support aspiring developers effectively.

5.4.1 For Educators

Universities should integrate special training into the curriculum on relevant 3D modeling tools, such as Maya and Blender. Such courses could be elaborated from the basics to more profound knowledge, which would help learners master skills qualitatively. Besides, other activities of short-term workshops dealing with practical challenges like working with interfaces or object modelling will help bridge the knowledge gaps and strengthen students' self-assurance.

It should also focus on project-based learning, where students are encouraged to create game assets from concept to implementation. This approach bridges theoretical knowledge with real-world application. Collaboration with game studios and software developers can provide access to professional tools, mentorship opportunities, and real-world projects, aligning education with industry demands.

5.4.2 For the Industry

The software developers should enhance the usability by developing more intuitive interfaces and a novice-friendly workflow, especially for 3D modeling, in order to reduce the barrier to entry and allow more users. This will be realized by offering low- or no-cost educational licenses to educational institutions, easing financial barriers to accessing industry-standard software for students.

This will be further supported by training programs, hackathons, and competitions that might spur skill development and innovation among upcoming game developers. Such initiatives not only help improve technical capabilities but also create a competitive and creative environment for learners. Growth in online communities and knowledge-sharing platforms can help in continuous learning at all levels and build a robust network for personal and professional development.

By implementing these recommendations, educators and industry stakeholders can address the challenges highlighted in the study, including limited training, accessibility issues, and skill gaps. These steps will foster a supportive ecosystem, enabling students to overcome barriers and thrive as aspiring game developers. Ultimately, such initiatives will prepare students To satisfy the changing needs of the game development sector, promoting innovation and creativity while expanding opportunities in this dynamic 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 a number of very important contributions because it focuses on DIU MCT undergraduates, thus making the research valid in a local context. It depicts the preferences and challenges faced by students in developing regions like Bangladesh. These insights highlight the unique needs of this demographic, placing valuable context for understanding their experiences.

The study also provides practical recommendations for educators, software developers, and industry stakeholders on how to introduce short-term workshops, formal training programs, and improvement in the usability of 3D modeling software to support beginners and improve learning outcomes.

It also closes the gap in research between academia and industry by pointing out mismatches in academic trainings and professional expectations. It calls for collaboration that should make educational curricula aligned with industry standards to equip students entering into creative roles like 3D artistry and environment design.

Finally, the study provided a foundation for future research through the identification of key factors of influence in either software preference or challenge. This opens the door for further investigation into how these factors bear on career readiness and technical skill development.

6.3 Limitations of the Study

Even this worthy study suffers from many shortcomings: its overall response level consists of 240 students, representing 20% of the total strength in the MCT department at DIU, and such small sample sizes offer little representation even within a broader studentship perspective or larger sections of gaming.

The study has a restricted geographical and cultural coverage, focusing only on Bangladesh and DIU; therefore, its findings have limited generalization in other parts of the world or other universities with different cultural, economic, or educational contexts.

Moreover, there is the presence of several biases due to reliance on self-reported survey data. Technical terms could be misunderstood, and socially desirable behaviours may be exaggerated, thus influencing the correctness of the results.

Additionally, the study has touched on the preference of software and problems faced without deeply going into prior features considered, cost factors involved, or how community support affects the adoption of a particular software. These gaps actually point to further areas that need investigation to consolidate the findings.

6.4 Directions for Future Research

Suggested areas of investigation in future studies based on the findings and limitations will include the following:

Extended Demographic Analysis:

Investigations similar to the one into other universities, regions, and other educational contexts allow for comparisons and validation to extend the view on preferences of and problems with 3D modeling software.

In-depth Investigation into the Factors of Influence:

Identify the detailed reasoning behind students preferring tools such as Autodesk Maya or Blender in regard to feature priority, cost-effectiveness, and ease of use.

Longitudinal Studies:

How preferences and challenges change over time for students transitioning from their education into their professional careers, considering training and real-life experiences that inform their choices regarding software applications.

Usability Enhancements:

Conduct extensive usability studies to identify and eliminate barriers in 3D modeling software interfaces, making it easier for novices to use.

Investigation of Training Models:

Test and evaluate different training models, including but not limited to workshops, online courses, and hybrid learning, that work best in teaching 3D modeling skills to up-and-coming game developers.

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