

**EFFECTS OF THE ANIM4GAMES SELF-LEARNING
MODULE ON THE LEVEL OF COMPETENCY
READINESS AMONG GAME DESIGN
STUDENTS THROUGH THE ADDIE
APPROACH AND RASCH
ANALYSIS**

WAN NOR RAIHAN BINTI WAN RAMLI

SULTAN IDRIS EDUCATION UNIVERSITY

2025



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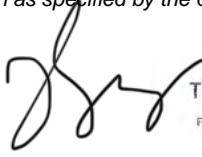
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SENIOR LECTURER
FACULTY OF COMPUTING AND META-TECHNOLOGY
SULTAN IDRIS EDUCATION UNIVERSITY
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ABSTRACT

The game design and animation industries complement one another with animation augmenting the visual and emotional aspects of the game world, while game design integrates technical, artistic, and interactive elements to create significantly meaningful, immersive, and innovative gaming experience. Such synergy has the potential to increase demand for highly skilled workforce within the creative industry. However, traditional animation predominantly focuses on cinematic approaches which frequently neglect the necessary adaptability in-game animation and consequently encumbers students' learning of critical skills. This study addresses this gap by designing and developing the Animation for Games (Anim4Games) Self-Learning Module, intended to measure the effects of the module on competency readiness among students from both creative and non-creative backgrounds entering game design. This study follows the ADDIE model, comprising three phases: Needs Analysis, Design and Development, and Evaluation. The study first employed the Fuzzy Delphi Method (FDM) for expert consensus, followed by a pilot study with 21 students to ensure the reliability of the instrument and module before full-scale implementation. This study then conducted a quasi-experimental pretest-posttest design with a non-equivalent control group (N=32) and an experimental group (N=32) to measure the module's effectiveness. The intervention results, analyzed using the Wright Map of Rasch analysis, visually depict changes in student performance. Findings indicate that students using the Anim4Games module demonstrated significant improvements compared to the control group, with higher gains in in-game animation knowledge (1.72 compared to 1.05), digital skillset creation (1.66 compared to 1.27), and competency readiness (1.84 compared to 0.69). This study contributes to game design education by introducing a validated self-learning module that is aligned with industry needs and has the potential for broader implementation in higher education curricula"





KESAN MODUL PEMBELAJARAN KENDIRI ANIM4GAMES TERHADAP TAHAP KESIAPSIAGAAN KOMPETENSI DALAM KALANGAN PELAJAR REKA BENTUK PERMAINAN MELALUI PENDEKATAN ADDIE DAN ANALISIS RASCH

ABSTRAK

Industri reka bentuk permainan dan animasi sating melengkapi antara satu sama lain, di mana animasi memperkukuh aspek visual dan emosi dunia permainan, manakala reka bentuk permainan menggabungkan elemen teknikal, artistik dan interaktif untuk mewujudkan pengalaman permainan yang bermakna, imersif dan inovatif. Sinergi ini berpotensi meningkatkan permintaan terhadap tenaga kerja berkemahiran tinggi dalam industri kreatif. Namun, animasi tradisional kebanyakannya menumpukan kepada pendekatan sinematik yang sering mengabaikan keperluan kebolehsuaian dalam animasi permainan, sekali gus menjejaskan pembelajaran kemahiran kritikal dalam kalangan pelajar. Kajian ini bertujuan untuk membangun dan menilai Modul Pembelajaran Kendiri Anim4Games bagi membantu pelajar dari pelbagai bidang, memperolehi kemahiran yang diperlukan dalam reka bentuk permainan. Pendekatan penyelidikan Model ADDIE yang terdiri daripada tiga fasa utama: Analisis Keperluan, Reka Bentuk dan Pembangunan, dan Penilaian digunakan untuk memastikan keberkesanan modul. Konsensus pakar juga diperolehi melalui Kaedah Fuzzy Delphi (FDM). Seterusnya, kajian rintis melibatkan 21 orang pelajar dijalankan untuk menilai kebolehpercayaan instrumen dan kesesuaian modul sebelum kajian sebenar dilaksanakan. Akhirnya, kajian sebenar, kuasi-eksperimen dengan pra dan pasca-ujian dilakukan dengan kumpulan kawalan (N=32) dan kumpulan eksperimen (N=32) bagi mengukur keberkesanan modul ini. Hasil intervensi dianalisis menggunakan Peta Wright dalam analisis Rasch, yang turut menunjukkan perubahan signifikan prestasi pelajar. Dapatan menunjukkan peningkatan dalam pengetahuan animasi dalam permainan (1.72 berbanding 1.05), kemahiran digital (1.66 berbanding 1.27), dan kesediaan berkompetensi (1.84 berbanding 0.69) dalam kalangan kumpulan eksperimen. Kajian ini menyumbang kepada pendidikan reka bentuk permainan dengan memperkenalkan modul pembelajaran sendiri yang disahkan serta relevan dengan keperluan industri, dan berpotensi untuk diterapkan secara lebih meluas dalam kurikulum pendidikan tinggi.



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LIST OF ABBREVIATIONS

6Ds	Six Disciplines
ADDIE	Analysis, Design, Development, Implementation, Evaluation
Anim4Games	Animation for Games
CBE	Competency-Based Education
CILLP	Creative Industry Lifelong Learning Programme
FDM	Fuzzy Delphi Method
HEI	Higher Education Institutions
ID	Instructional Design
IHL	Institutions of Higher Learning
IRT	Item Response Theory
MDEC	Malaysia Digital Economy Corporation
MQA	Malaysian Qualification Agency
MyDigital	Malaysia Digital Economy Blueprint
OBE	Outcome-Based Education
PCM	Percentage Calculation Method
RMT	Rasch Measurement Theory
SEA	SouthEast Asia
SDL	Self-Directed Learning
SLM	Self-Learning Module
UI	User Interface
WRS	Work Readiness Scale





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- A Peers' Remarks To Anim4games Self-Learning Module
- B Approval Letter to Conduct Pilot Study
- C Student Verification Letter for Conducting Research





CHAPTER 1

INTRODUCTION

1.1 Introduction

In recent years, the game industry has evolved into a robust global market integrating entertainment, storytelling, interactivity, and technology. As a result, game design education must adapt to these industry demands by equipping students with a broad range of creative and technical competencies. Among the core skills required in game development is animation, which plays a critical role in character movement, environmental storytelling, and overall game aesthetics. For aspiring game designers, proficiency in animation enhances their creative capabilities and improves their employability and readiness for real-world production environments (Roth & Koenitz, 2016).

However, teaching and learning animation can be challenging. Traditional classroom instruction often lacks the flexibility to accommodate students' diverse learning styles and paces. Moreover, the rapid pace of technological advancement necessitates continual upskilling, which can strain students and educators (Gee, 2003). These challenges highlight the importance of innovative instructional approaches that foster independent learning and competency development. One strategy involves self-learning modules, allowing learners to control their learning process through structured,





interactive, and self-paced content. This difficulty intensifies in creative technology programs, where rapid software updates and shifting industry standards require educators to reframe their teaching approaches constantly.

The Anim4Games Self-Learning Module was developed to address the educational needs of game design students in the context of 2D animation. The module incorporates theoretical concepts and practical exercises, guiding learners through the pre- and post-production animation pipeline. The instructional design is based on the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), a well-established framework for developing effective educational materials (Branch, 2009). By following the ADDIE model, the module ensures alignment between learning objectives, instructional strategies, and student outcomes.



To evaluate the impact of the Anim4Games module on students' competency readiness, this study employs the Rasch measurement model, a psychometric method grounded in item response theory. Rasch analysis allows for detailed measurement of latent traits such as knowledge, skill mastery, and confidence, providing a robust framework for evaluating learning outcomes (Bond & Fox, 2015). Combining instructional design with rigorous analysis, this dual approach comprehensively examines how structured self-learning resources influence students' preparedness for animation tasks within game development.

The significance of this study lies in its contribution to educational innovation within the field of game design. As creative disciplines increasingly integrate technology into teaching practices, there is a growing need for pedagogical tools that





are both flexible and evidence-based. By evaluating the Anim4Games module, this research offers practical insights for curriculum designers and supports the broader movement toward student-centered learning in creative technology education (McKenney & Reeves, 2012).

Furthermore, the focus on competency readiness is especially relevant in today's educational landscape, where employability and industry alignment are key priorities. Game development programs must ensure that students graduate with the skills to contribute meaningfully to collaborative, multidisciplinary production pipelines. Studies have shown that self-paced, experiential learning can enhance motivation, critical thinking, and long-term retention, key components of competency-based education (Kolb, 1984; Mayer, 2009).



In conclusion, this study examines the effects of the Anim4Games Self-Learning Module on the competency readiness of game design students, using a structured ADDIE-based design and Rasch analytical approach. The findings will provide valuable data on the efficacy of self-learning modules in animation education for game design and development, and inform the development of scalable, flexible instructional resources for the creative industries.

The evolution of animation from its early days to its current prominence in computerized platforms reflects a confluence of artistic innovation and technological advancement. This transformation underscores the ongoing dialogue between creators and technology, a relationship that redefines animation's boundaries and its role in contemporary digital culture.





1.2 Background Research

The global game industry has rapidly become one of the most dynamic and innovative creative sectors. Beyond entertainment, games are now used for education, health, training, and storytelling. This evolution demands that game designers possess various competencies: creative thinking, problem-solving, technical proficiency, storytelling, visual communication, animation, and user experience design. Together, these competencies form a holistic profile of a game designer who must balance creativity with technical execution to thrive in multidisciplinary teams. As a result, game design education must go beyond teaching software tools and aim to prepare students for the complex, real-world challenges they will face in multidisciplinary development teams (Salen & Zimmerman, 2004).



One of the central goals of any game design program is to ensure competency readiness, the ability of students to apply what they have learned in professional or practical settings. Competency in game design is not confined to one area but includes skills such as ideation, narrative development, level design, playtesting, visual prototyping, and animation. Animation plays a significant role in this ecosystem, not only in character and environmental expression but also in gameplay feedback, transitions, and user engagement. However, animation is only one component of a much broader skill set needed by future game designers.

Despite curriculum efforts to integrate various aspects of game design, many students face challenges in developing confidence and competency across multiple skills in the game development pipeline. These challenges highlight the need for





instructional innovations that support flexible, practice-oriented, and student-centered learning. Traditional classroom teaching is often limited by time, instructor availability, and the pace of instruction, which may not suit all learners equally. In creative fields like game design, where learning is often iterative and exploratory, these limitations can hinder students' ability to develop their skills fully.

1.2.1 Self-Learning Modules (SLMs) in Education

To address the challenges of independent learning and skill acquisition, especially in creative fields like game design, many educational institutions are adopting Self-Learning Modules (SLMs). These self-contained instructional materials guide learners through content, activities, and assessments at their own pace (Knowles, 1975). SLMs promote learner autonomy, allowing students to revisit complex concepts, manage their learning paths, and take ownership of their educational journey. This approach suits blended and remote learning environments, where self-regulation and motivation are critical.

SLMs have been successfully applied in various disciplines, including science, technology, engineering, digital media, and the arts. Their strength lies in promoting active learning and metacognition, the ability to reflect on and regulate one's learning processes (Mayer, 2009). By engaging with content contextually and iteratively, students improve their understanding, retention, and ability to apply knowledge in real-world scenarios. They are particularly effective for learners who require flexibility, such as part-time students, working professionals, or those in regions where access to physical resources is limited.





In the context of game design education, SLMs can support the development of essential competencies such as systems thinking, narrative development, user-centered design, visual storytelling, and interactive feedback. For example, a module may guide students through building a playable prototype, animating UI elements, or refining a game mechanic through iterative testing. These modules support knowledge acquisition and help learners produce tangible, practice-based outputs that reflect their progression and readiness for industry demands.

The effectiveness of SLMs in game design hinges on thoughtful instructional design. A well-structured module should align with clearly defined learning objectives and offer engaging, relevant content that facilitates hands-on learning. The ADDIE model, Analysis, Design, Development, Implementation, and Evaluation, provides a comprehensive framework for creating effective SLMs. It emphasizes the importance of conducting a thorough needs assessment to understand the learners' existing competencies, learning preferences, and contextual requirements, ensuring that the final product is both learner-centered and outcome-driven.

1.2.2 Self-Learning Modules (SLMs) and Competency Readiness in Game Design

Competency readiness is a critical goal in practice-based disciplines like game design. It encompasses theoretical understanding and the ability to apply knowledge in real-world contexts, such as designing functional game elements, collaborating effectively in teams, solving design problems creatively, and presenting ideas professionally. Competent learners can analyze challenges, implement solutions, and critically reflect





on outcomes to improve their work, aligning their skills with academic and industry expectations.

In Malaysia, the digital creative content industry, which includes game development and animation, has been identified as a key driver of the digital economy. According to Malaysia Digital Economy Corporation (MDEC), the sector contributed RM1.65 billion in export revenue in 2022 and continues to show upward growth potential. With the rise of local studios such as Lemon Sky Studios, Streamline Studios, and Passion Republic, there is an increasing demand for knowledgeable, practically competent, and industry-ready graduates. However, a 2021 MDEC Talent Gap Study found that many digital content graduates lacked hands-on experience and struggled to meet industry expectations in prototyping, user experience design, and iterative development.



Self-Learning Modules (SLMs) support this competency-based approach by offering flexible, self-directed learning environments where students progress by demonstrating mastery rather than completing a fixed number of classroom hours (Knowles, 1975; Gervais, 2016). In game design, this might include developing a playable prototype, producing an animated sequence that enhances storytelling, or refining UI elements based on user feedback. Such performance-based assessments resonate with the K-Worker model promoted by MDEC, which emphasizes the cultivation of knowledge workers with critical thinking, problem-solving, and practical abilities. Integrating SLMs with the K-Worker model aligns with broader educational reforms in Malaysia that emphasize lifelong learning, digital innovation, and the cultivation of adaptable graduates capable of contributing to Industry 4.0 initiatives.





SLMs also foster autonomy and metacognitive development by enabling students to revisit complex topics, such as ideation, animation integration, level design, and user testing at their own pace and on their terms (Mayer, 2009). This learner-centered approach supports diverse learning styles and prior experience levels, providing a safe space for experimentation and iterative improvement. Moreover, it aligns with MDEC's Digital Content Ecosystem development strategy, which advocates for industry-relevant curriculum design, modular learning, and greater integration between academia and digital content production pipelines.

When well-designed, SLMs offer authentic learning experiences that result in tangible outputs aligned with industry expectations. Embedded assessments and feedback mechanisms further enhance reflective practice, allowing students to monitor their progress, refine their skills, and demonstrate competency through performance-based tasks that mirror real-world game development processes. By adopting such pedagogical tools, higher education institutions in Malaysia can play a proactive role in bridging the talent gap and supporting the nation's goal to become a regional leader in digital creative content.

1.2.3 Anim4Games SLM as an Innovative Tool

To support game design students in developing their readiness, the Anim4Games Self-Learning Module was created. It is a self-directed learning resource designed to guide students through various animation skills relevant to game production. While the module includes animation-related tasks, it covers broader areas such as planning, concept development, digital asset preparation, and interactive design.





Anim4Games is innovative because it integrates multiple aspects of game design into one cohesive, learner-friendly module. It is structured to simulate real-world workflows and encourages students to think through their design decisions, not just follow software tutorials. Activities include guided challenges, design reflections, peer review prompts, and task checklists. The module also embeds formative assessments, allowing students to track their progress and receive targeted feedback. By combining theory with practice, the module also bridges academic learning outcomes and the day-to-day workflows observed in professional game studios.

Current regional workforce trends support this flexible approach. According to the SEA Game Talent Economics Report 2024, Animation/Art & Design ranks as the second most in-demand technical skill in the Southeast Asia game development sector (23%), just after Programming & Development (39%). The report also highlights that animation and 3D/CGI expertise are crucial for Southeast Asian countries such as Malaysia, where many studios are engaged in outsourced and global content production pipelines.

This strong industry demand underscores the relevance of Anim4Games. The module addresses academic and employment preparation needs by providing structured, self-paced, and industry-informed learning pathways. Its flexibility makes it suitable for various learning environments, whether in the classroom, in hybrid formats, or during internship placements. The module is a learning and readiness tool that enables students to work independently while developing specific skills





1.2.4 Instructional Design Using the ADDIE Model

The development of Anim4Games was guided by the ADDIE instructional design model, a systematic and widely recognized framework consisting of five phases: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). This model ensured the module was content-driven and aligned with pedagogical principles and learner needs. In the Analysis phase, the design team identified key challenges faced by game design students, such as varied academic backgrounds, inconsistent foundational knowledge, and limited opportunities for feedback. The Design and Development phases focused on creating competency-aligned learning outcomes, interactive content, and embedded self-assessment tools, structured to support deep learning and based on standards outlined in Malaysia's Programme Standards for Creative Multimedia (MQA, 2015). During the Implementation phase, the module was deployed in real academic settings with game design students to test usability, engagement, and instructional relevance. Finally, the Evaluation phase gathered ongoing learner feedback and performance data to refine the module and ensure continuous improvement.

By applying the ADDIE model, Anim4Games achieves more than structural coherence; it reflects instructional best practices and learning science, making it a reliable and adaptable tool for enhancing competency readiness in creative and game design education. Its design process also offers a replicable framework for future self-learning modules (SLMs) in similar domains.





1.2.5 The Importance of Rasch Analysis for the Study

To determine the impact of the Anim4Games module on students' competency readiness, this study adopts Rasch analysis, a robust psychometric method grounded in Item Response Theory (IRT). Unlike traditional test scoring, Rasch modeling offers interval-level data that considers both the difficulty of learning tasks and the learner's ability, allowing for more accurate and meaningful measurements of learning outcomes (Bond & Fox, 2015).

This approach is particularly valuable in creative education, where assessments are often subjective or product based. Rasch analysis brings greater objectivity by evaluating how well tasks align with students' varying ability levels, whether the assessment items accurately reflect the intended competencies, and whether students demonstrate measurable progression after engaging with the module. In doing so, it ensures that each item contributes meaningfully to the measurement of targeted skills and that the difficulty of tasks is appropriate for learners at different stages of development.

By applying Rasch analysis, the study introduces psychometric rigor into evaluating the Anim4Games module. This strengthens the validity and reliability of the findings and ensures that the instructional effectiveness of the module is assessed with fairness, precision, and depth. Ultimately, the insights derived from this analysis will inform refinements to the module and support the broader goal of enhancing competency-based learning in creative disciplines like game design.





While self-learning tools are increasingly integrated into education, there remains a lack of focused research on their effectiveness in game design education, particularly when delivered through a structured instructional framework supported by validated measurement tools. Much existing literature emphasizes general e-learning environments or targets isolated technical skills such as coding, modeling, or digital drawing. This narrow focus overlooks the broader, interdisciplinary competencies required in game design, such as creative planning, storytelling, visual communication, interactivity, and user-centered design. As a result, there is a significant gap in understanding how holistic, self-directed modules can support competency readiness in this field.

This study aims to bridge that gap by investigating the impact of the Anim4Games Self-Learning Module on students' overall competency readiness. It employs the ADDIE instructional design model to ensure structured and pedagogically sound content and utilizes Rasch analysis to accurately measure learning outcomes and progression. Through this approach, the study evaluates the module's effectiveness and contributes a scalable model for the future development of instructional tools in game design education. The findings are expected to benefit curriculum developers, educators, and institutions seeking to strengthen practice-based learning and better prepare students for the demands of the creative industry. With this context established, the following section outlines the problem statement underpinning this study's rationale.





1.3 Problem Statement

The global video game industry continues to grow, fueled by technological advances, increasing demand for immersive digital content, and the widespread availability of gaming platforms. In response, game development has become inherently multidisciplinary, requiring competencies in animation, user experience, storytelling, systems thinking, and interactivity (Salen & Zimmerman, 2004). Academic programs have emerged to train students in game design, yet ensuring these graduates possess job-ready, industry-aligned skills remains a persistent challenge.

This issue is particularly pronounced in Malaysia. Although the country aspires to be a regional leader in digital content production, with MDEC (2018) reporting the highest number of animation-related courses among Southeast Asian nations, graduates face difficulties entering the workforce. A key concern is the disconnect between academic instruction and real-world production environments, especially in subfields such as animation for games, where integration with interactivity, responsiveness, and game engines is crucial (Pluralsight Content Team, 2014).

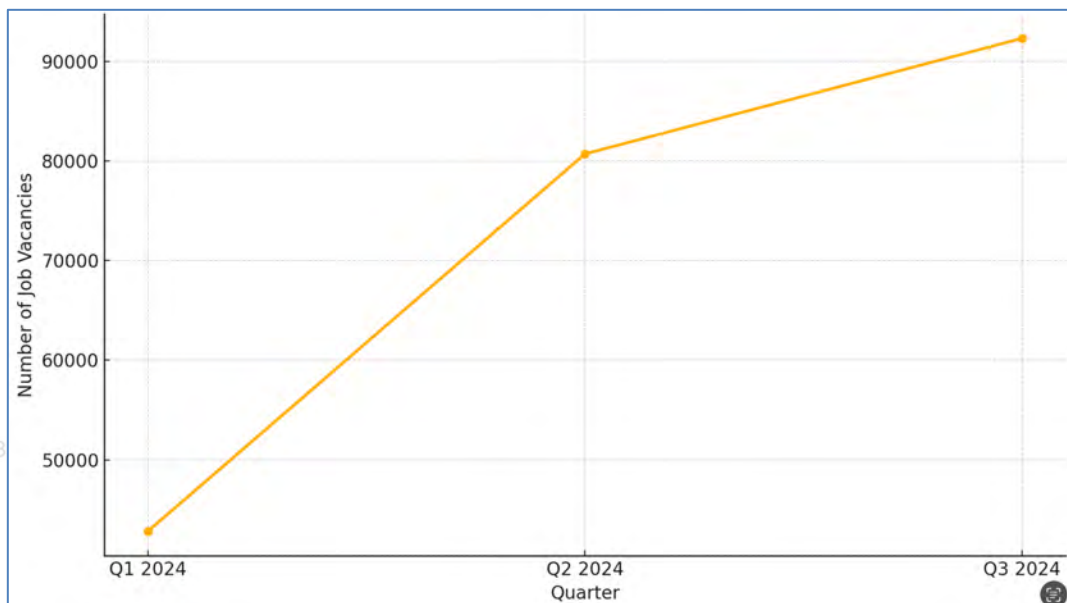
The urgency of this talent-supply imbalance is emphasized in the Digital Talent Snapshot Q3 2024 by MDEC (see Figure 1.1). While Malaysia saw 357,414 digital talents recorded on LinkedIn, a growth of 2.07% from Q2 and 6.6% from Q1, this growth is gradually slowing, suggesting a plateau in talent acquisition despite rising demand. More significantly, digital job vacancies surged to 92,324 in Q3, up from 80,719 in Q2 and 42,835 in Q1, indicating a widening digital skills gap that current education pipelines are struggling to fill (MDEC, 2024). Such gaps affect Malaysia's



competitiveness in the regional market and students' confidence, as many graduates find themselves underprepared for fast-paced production settings upon entering the workforce.

Figure 1.1

Growth in Digital Job Vacancies in Malaysia (Q1-Q3 2024)



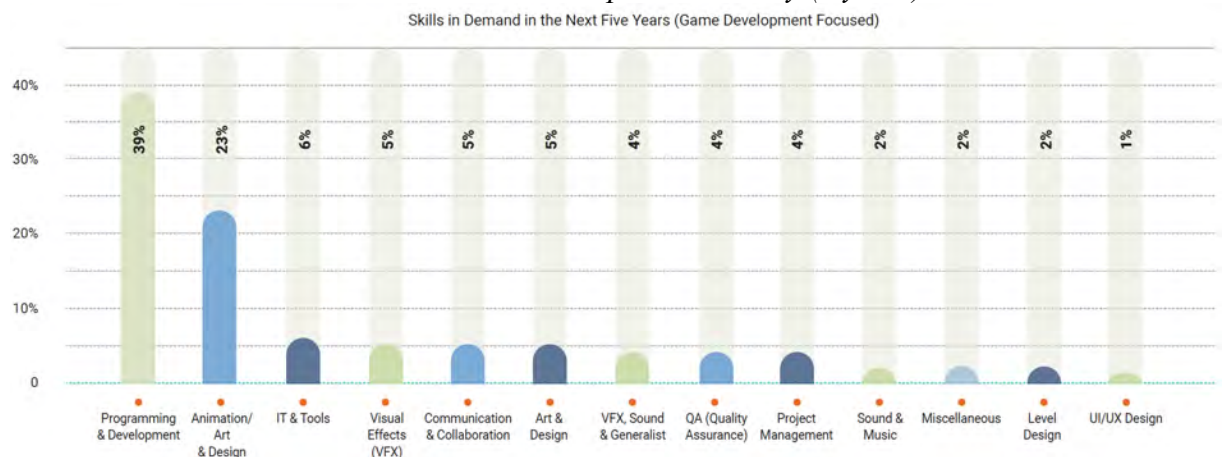
Data source by MDEC (2024)

Tools such as Adobe Photoshop, JavaScript, HTML, and SQL are among the top in-demand digital skills in both creative and technical roles. However, animation integrated with interactive workflows remains critically underemphasized in traditional academic curricula. This is concerning given that the SEA Game Talent Economics Report (2024) identifies Animation/Art & Design as the second most in-demand skill (23%) across Southeast Asia's game development industry, trailing only behind Programming & Development (39%). This data reinforces the regional need for hybrid creative-technical competencies and highlights a glaring gap in academic offerings that

neglect game-specific animation education. According to the SEA Game Talent Economics Report (2024), Animation/Art & Design ranks as the second most in-demand technical skill in Southeast Asia's game industry (see Figure 1.2)

Figure 1.2

Technical Skills Demand in SEA Game Development Industry (5 years)



Findings from SEA Game Talent Economics Report (2024)

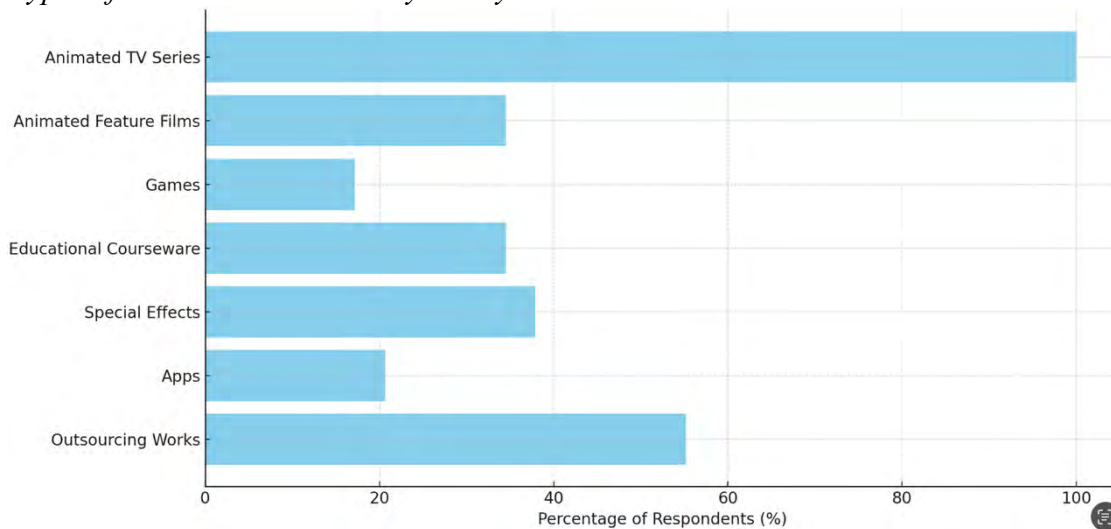
Compounding this issue is the limited presence of game development programs in Malaysian public institutions. Most offerings are confined to private institutions with higher tuition fees, thus restricting access for low-income students (Wright, 2013). Furthermore, despite national frameworks such as the MQA Creative Multimedia Programme Standards (2015), which delineate domains of Game Art, Design, and Technology, animation for games is still not formally recognized as a distinct competency within official curriculum structures.

Kamaruddin et al. (2013) further underscore this structural gap. In their survey of 29 Malaysian animation ventures, only 17.2% were involved in game production, with the majority focusing on TV animation or outsourced content. This suggests a

production misalignment and a lack of instructional preparedness to meet emerging industry needs in game-based animation.

Figure 1.3

Types of Animation Products by Malaysian Animation Ventures



Adaptation from Kamaruddin et al, 2013

Table 1.1

Types of animation products provided

Products	Number of respondents	Percentage (%)
Animated TV series	29	100
Animated feature films	10	34.5
Games	5	17.2
Educational courseware	10	34.5
Special effects	11	37.9
Apps	6	20.7
Outsourcing works	16	55.2

Data sources by Kamaruddin et al., 2013



MDEC (2024) notes that over 50% of industries with the highest digital talent demand are in non-tech sectors, reducing the already narrow pool of creative digital talent available for core domains like game animation. This shortage presents a critical challenge for sustaining the growth of Malaysia's animation and game development ecosystem, as industry-ready graduates in specialized areas, such as in-game animation, remain scarce. The lack of adequately trained professionals not only hampers production capacity but also limits innovation, particularly in the emerging regions requiring technical proficiency and creative problem-solving skills.

To address these persistent gaps, Self-Learning Modules (SLMs) represent a viable alternative, a pedagogical strategy. SLMs allow students to learn independently, perform iterative production-oriented exercises, and practice decision-making in simulated work environments. However, the adoption of SLMs in creative disciplines, particularly in game animation, is minimal. Existing implementations often lack instructional scaffolding, real-world relevance, or validation using robust models like ADDIE or Rasch.

Building on this rationale, the present study proposes the Anim4Games Self-Learning Module (SLM), a student-centred instructional tool designed to embed animation practices within game development contexts. The module is structured to address the distinct needs of game animation students by providing guided, yet flexible, learning pathways that simulate real-world production processes. Grounded in the ADDIE instructional design model, the module ensures systematic planning, development, implementation, and evaluation. In contrast, using the Rasch measurement model (Bond & Fox, 2015) provides a robust, empirical basis for





assessing its effectiveness. Through this integrated approach, the study aims to determine the extent to which the Anim4Games SLM can improve students' competency readiness, equipping them with the technical, creative, and problem-solving skills demanded by the industry.

In summary, this research's core problem is the lack of practical, validated instructional tools that seamlessly integrate animation into game design education in Malaysia. Without such tools, graduates risk entering the workforce with fragmented, outdated, or mismatched skill sets—gaps that can severely hinder their employability and career progression. This misalignment between academic preparation and industry expectations affects individual career prospects and undermines Malaysia's capacity to compete and lead in Southeast Asia's creative digital economy. By empirically validating the Anim4Games SLM, this study seeks to contribute to both academic knowledge and practical solutions for bridging the competency gap, ultimately enhancing graduate readiness for the fast-evolving demands of the game design sector.

1.4 Purpose and Objectives of the Study

This study is designed to investigate the effects of the Anim4Games Self-Learning Module (SLM) on enhancing competency readiness among game design students, specifically focusing on integrating animation into broader game development practices. The module is introduced as an innovative educational intervention within game design curricula, aiming to strengthen foundational and intermediate competencies in animation application, interactive design, and digital skillset





development. By addressing existing skill gaps and aligning learning activities with authentic industry workflows, the study seeks to contribute to the development of graduates who are both technically proficient and creatively agile

By embedding the module into game design programs, particularly those involving final-year undergraduates, the study aims to evaluate how a structured, self-paced instructional tool, developed using the ADDIE instructional design model, can enhance learning outcomes, foster independent problem-solving skills, and increase readiness for industry roles. The Rasch measurement model is applied to ensure a robust psychometric evaluation of the module's effectiveness, enabling both qualitative and quantitative insights into students' competency gains. This dual-method evaluation approach ensures the findings are grounded in rigorous educational measurement while capturing students' lived experiences engaging with the module.

Ultimately, this study seeks to position the Anim4Games Self-Learning Module as a scalable, adaptable, and effective model for integrating animation within core game design education. By doing so, it aims to contribute to Malaysia's growing creative digital economy, address the nation's digital talent shortage, and strengthen the alignment between higher education provision and the evolving demands of the game design and animation industry. The long-term vision is for this module to serve as a benchmark for similar instructional interventions across Southeast Asia, particularly in contexts where industry-specific skills integration into academic programs remains underdeveloped. By situating this research within the ADDIE framework, the study provides a structured instructional design and a replicable model for future educational interventions.





Therefore, the research objectives of this study cover three (3) distinct phases, each aligned with a specific phase of the ADDIE model: Analysis, Design, Development, and Evaluation. Each phase contains targeted goals that guide the process from initial needs assessment to instructional design and validation, ensuring that the module is pedagogically sound, industry-relevant, and empirically supported. The research will thus address the following objectives (RO):

Phase 1: Needs Analysis Phase

RO1: To identify the need for a preparatory Animation for games (Anim4Games) self-learning module among students in the game design program

Phase 2: Design and Development Phase

RO2: To validate the design and development of the Animation for Games (Anim4Games) self-learning module based on the ADDIE instructional model.

RO3: To assess the reliability of the Animation for Games (Anim4Games) Self-learning module content and structure.

Phase 3: Evaluation Phase

RO4: To evaluate the changes in students' animation knowledge before and after the intervention.

RO5: To evaluate the changes in students' digital skillsets before and after the intervention.

RO6: To evaluate the effect of the Anim4Games self-learning module on students' overall competency readiness for game design, before and after the intervention.





1.5 Research Question

This study investigates how a self-learning instructional tool, Anim4Games, can address competency gaps in game design education, particularly in animation for games. The research is framed around six key research questions, mapped to the three phases of the ADDIE instructional design model (Analysis, Design & Development, and Evaluation), and aligned with regional talent demands and validated instructional strategies.

Phase 1: Needs Analysis Phase

RQ1: What are the current needs and gaps in animation integration within game design programs that justify the development of the Animation for Games (Anim4Games) self-learning module?



RQ2: How was the ADDIE framework applied in designing and developing the Anim4Games self-learning module?

RQ3: How reliable and consistent is the content and structure of the Anim4Games self-learning module, based on expert and learner validation?

Phase 3: Evaluation Phase

RQ4: To what extent does the Anim4Games self-learning module improve students' understanding and application of animation within game design?

RQ5: To what extent does the module enhance students' digital skillset development in areas relevant to game production?

RQ6: To what extent does the Anim4Games self-learning module affect the competency readiness for a game design environment?



To ensure alignment between the research objectives and research questions, this study establishes a mapping to ensure alignment between the research objectives and research questions. This mapping provides a clear connection between what the study aims to achieve (objectives) and the specific inquiries it seeks to answer (research questions). By organizing the objectives and questions according to the ADDIE instructional design phases, the table demonstrates the systematic structure of the research. It also serves as a reference framework that guides the methodology (Chapter 3), findings (Chapters 4–6), and discussion (Chapter 7).

Table 1.2

Mapping of Research Objectives (ROs) to Research Questions (RQs).

Phase	Research Objective (RO)	Research Question (RQ)
Phase 1 Needs Analysis	RO1: To identify the need for a preparatory Animation for games (Anim4Games) self-learning module among students in the game design program.	RQ1: What are the current needs and gaps in animation integration within game design programs that justify the development of the Animation for Games (Anim4Games) self-learning module?
Phase 2 Design and Development	RO2: To validate the design and development of the Animation for Games (Anim4Games) self-learning module based on the ADDIE instructional model.	RQ2: How was the ADDIE framework applied in designing and developing the Anim4Games self-learning module?
	RO3: To assess the reliability of the Animation for Games (Anim4Games) Self-learning module content and structure.	RQ3: How reliable and consistent is the content and structure of the Anim4Games self-learning module, based on expert and learner validation?



Phase	Research Objective (RO)	Research Question (RQ)
Phase 3 Evaluation	RO4: To evaluate the changes in students' animation knowledge before and after the intervention.	RQ4: To what extent does the Anim4Games self-learning module improve students' understanding and application of animation within game design?
	RO5: To evaluate the changes in students' digital skillsets before and after the intervention.	RQ5: To what extent does the module enhance students' digital skillset development in areas relevant to game production?
	RO6: To evaluate the effect of the Anim4Games self-learning module on students' overall competency readiness for game design, before and after the intervention.	RQ6: To what extent does the Anim4Games self-learning module affect the competency readiness for a game design environment?



1.6 Research Hypothesis

The research hypothesis on data collection for this research uses statistical tests, and based on the research objectives and research questions, hypotheses are formulated particularly for the Evaluation Phase (RO4–RO6), where the study anticipates measurable changes before and after the intervention with the Anim4Games self-learning module. The Needs Analysis Phase (RO1) and the Design & Development Phase (RO2–RO3) are exploratory and therefore do not require formal hypotheses. Table 1.3 shows the constructive alignment between the Research Objectives (RO), Research Questions (RQ), and Hypothesis to achieve the overall research aim.



**Table 1.3**

Constructive Alignment between Research Questions, Research Objectives, and Hypotheses of the Research

Research Objective	Research Question	Hypotheses
RO1	RQ1	Not applicable
RO2	RQ2	Not applicable
RO3	RQ3	Not applicable
RO4	RQ4	H0 ₁ : No significant difference exists between the CG and EG in pre-test and post-test mean scores of in-game animation knowledge. H1 ₁ : A significant difference exists between the CG and EG in pre-test and post-test mean scores of in-game animation knowledge.
RO5	RQ5	H0 ₂ : No significant difference exists between the CG and EG in pre-test and post-test mean scores of digital skillset creation. H1 ₂ : A significant difference exists between the CG and EG in pre-test and post-test mean scores of digital skillset creation.
RO6	RQ6	H0 ₃ : No significant difference exists between the CG and EG in pre-test and post-test mean scores of competency readiness. H1 ₃ : A significant difference exists between the CG and EG in pre-test and post-test mean scores of competency readiness.

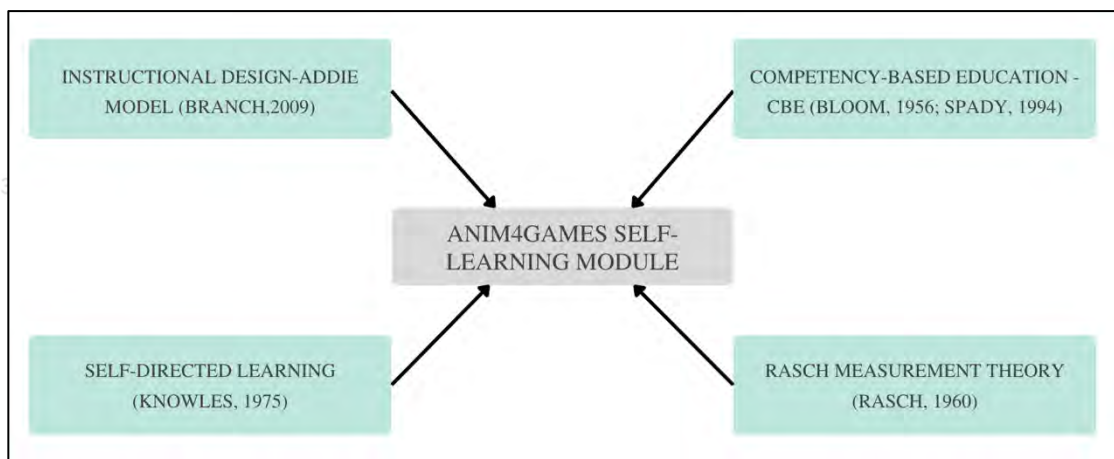


1.7 Theoretical Framework of Research

This study is grounded in four interrelated theoretical underpinnings: Instructional Design Theory (ADDIE Model), Self-Directed Learning Theory, Competency-Based Education, and Rasch Measurement Theory. Together, these frameworks guide the development, implementation, and evaluation of the Anim4Games Self-Learning Module.

Figure 1.4

Theoretical Framework underpinning Anim4Games Self-learning module.



1.7.1 Instructional Design Theory (ADDIE Model)

The ADDIE Model, an acronym for Analysis, Design, Development, Implementation, and Evaluation, has long been a cornerstone in instructional systems design. Developed in the 1970s, it is rooted in behaviorist and cognitivist learning theories, promoting systematic instructional planning and structured content delivery to achieve defined learning outcomes (Molenda, 2003; Branch, 2009). Despite its origins as a traditional and linear framework, the ADDIE model remains highly relevant today due to its



adaptability to various educational technologies and learner-centered approaches (Aldoobie, 2015).

In the Malaysian context, the ADDIE model continues to be a trusted and practical framework for instructional development, especially in designing digital and blended learning environments. Stapa and Mohammad (2019) employed ADDIE to develop a blended learning application tailored for vocational college students, aligning instructional strategies with technical and vocational needs. Similarly, Abdul Ghani, Daud, and Taib (2018) applied the model in developing an educational website for Arabic language learning in tourism, demonstrating the model's adaptability in content-specific and cultural contexts. More recently, Suratnu (2023) used ADDIE to design a remedial instructional module for Malay language students, reinforcing its practical relevance for localized curriculum development.

These examples reflect the enduring relevance of the ADDIE model, not only globally but also within Malaysia's educational landscape. In this study, the ADDIE model is the guiding framework for designing the Anim4Games self-learning module. It ensures pedagogical alignment, learner engagement, and systematic evaluation, which are critical for developing a module that enhances competency readiness in game design students.

1.7.2 Self-Directed Learning Theory

Self-Directed Learning (SDL), introduced by Knowles (1975), is a learning approach where adult learners take responsibility for their learning. This includes identifying





learning needs, setting goals, choosing resources, applying strategies, and evaluating results. SDL encourages autonomy, motivation, and active participation—essential skills in flexible, digital learning environments. The Anim4Games module supports SDL by allowing learners to progress at their own pace, interact with learning content independently, and reflect on their progress. These traits align with the creative and adaptive skills required in animation and game design education.

However, as Hiemstra (2008, as cited in Ahmad & Majid, 2010) noted, SDL is also influenced by cultural and technological factors. In Malaysia, where collectivist values are shared, learners may rely more on group support and teacher guidance. Cultural norms can affect how freely learners engage in self-directed tasks. Ahmad and Majid (2010) also highlight that access to digital tools and online platforms is growing in enabling SDL. Therefore, Anim4Games is designed to promote independent learning while respecting cultural learning styles and providing structure when needed.

1.7.3 Competency-Based Education (CBE)

Competency-Based Education (CBE) is a learning approach that focuses on students mastering specific skills and knowledge rather than completing a set amount of classroom time. Based on Bloom's Taxonomy and Outcome-Based Education (OBE), CBE ensures learners achieve clear and measurable outcomes. In this study, the Anim4Games module was designed using CBE principles to help students build real-world skills in animation and digital game asset development. The module provides step-by-step learning, hands-on practice, and targeted feedback to ensure students meet industry-relevant competencies.





Recent studies show that combining CBE with technology can improve learning further. Wan Yahaya and Zaini (2025) highlighted how Artificial Intelligence (AI) can personalize learning, giving learners instant feedback and adapting content to their needs. Dua, Johan, and Lasar (2025) also emphasized the importance of structured instructional design in CBE, with growing global interest—especially in Malaysia. These insights support the design of the Anim4Games module as a flexible, learner-centered tool that prepares students for the demands of the animation and game industry.

1.7.4 Rasch Measurement Theory

The Rasch Measurement Theory, developed by Georg Rasch, is a probabilistic model in psychometrics used to assess item responses and measure underlying traits such as abilities, attitudes, or readiness. It transforms ordinal-level responses (such as Likert scales) into interval-level data, allowing for more precise and meaningful interpretations of learners' progress and performance. Rasch modeling ensures that measurement tools are valid, reliable, unidimensional, and free from item bias—key factors for making sound educational decisions.

Recent research by Avcu (2025) highlights the significant role of Rasch modeling in improving classroom assessment, particularly in measuring student attitudes such as motivation, engagement, and course perceptions. The model has been effectively applied across various educational levels, from primary coding attitudes to university-level course evaluations. It shows its flexibility and strength in refining





instruments and diagnosing item-level bias. This study will use Rasch analysis to evaluate students' competency readiness and attitudes after engaging with the Anim4Games self-learning module. Its objectivity and scalability make Rasch suitable for validating assessment tools and supporting data-driven refinements in instructional design.

The inclusion of Rasch Measurement Theory collectively reinforces the development of a rigorous, learner-focused instructional module that addresses both pedagogical effectiveness and industry relevance in animation for game design. By applying Rasch analysis, this study ensures that the assessment instruments used within the Anim4Games module are statistically valid, reliable, and capable of accurately capturing learners' progression and competency readiness. This level of psychometric precision is essential for aligning educational outcomes with real-world expectations, especially in creative technology fields where skill mastery is critical.

Furthermore, the Rasch model's ability to identify item bias and calibrate performance scales enhances the objectivity of the learning evaluation process, making it more transparent and actionable for educators and curriculum designers. As such, the integration of Rasch Measurement Theory supports the goal of building a self-learning module that is both evidence-based and tailored to the evolving needs of the digital game and animation industry. The integration of these theories reflects a deliberate attempt to combine pedagogical rigor with empirical validation, ensuring that the Anim4Games module is both educationally sound and practically applicable.





1.8 Conceptual Framework of Research

The conceptual framework illustrated in Figure 1.5 forms the foundation of this study, encapsulating a systematic strategy for developing and evaluating the Animation for Games (Anim4Games) Self-learning Module. Central to this framework is the ADDIE model, an established instructional design methodology comprising five stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2010). The ADDIE process ensures the creation of effective, learner-centered content that aligns with the needs of students enrolled in game design programs (Gagné et al., 2005; Morrison et al., 2007).

The research begins with a needs analysis phase, identifying specific gaps in learning that the Anim4Games module seeks to address. This phase uses structured expert input and techniques such as the Fuzzy Delphi Method to ascertain the module's relevance and scope (Cheng & Lin, 2002; Mohd Yusoff et al., 2019). Subsequent phases follow the ADDIE sequence—starting with the identification of learning goals and target learners (Analysis), progressing through the instructional design and content structuring (Design), and the actual creation of learning materials (Development). The module is then tested in a real-world classroom setting (Implementation) and assessed for effectiveness in enhancing student outcomes (Evaluation).

This research applies the ADDIE model iteratively to build a self-learning module that supports the development of in-game animation skills and digital competency, aiming to better prepare students for careers in the game design industry





(Branch, 2010; Pollock et al., 2010). It is anticipated that integrating this module will result in measurable improvements in students' readiness for professional practice.

In the development phase, this study also refers to several established models for module design and validation, including those by Russell (1974), Sidek and Jamaluddin (2005), and Mohamad Aziz Shah (2012), which emphasize content validity, instructional sequencing, and learner engagement.

The second phase in the framework involves experimental validation, employing a quasi-experimental design with pre-tests and post-tests to determine the Anim4Games module's impact. This design measures student competence before and after the intervention, consistent with the recommendations of Campbell and Stanley (1963), Creswell (2014), and Ghazali and Sufean (2018).

The framework is structured to explore a cause-and-effect relationship between the independent variable (the Anim4Games module) and the dependent variable (students' competence-readiness). This aligns with earlier educational research emphasizing the impact of structured modules on learner outcomes (Behlol, 2009; Elam, 1986; Miller, 1979; Shamsuri, 2012; Wijayanti, 2012).

Competency, as defined by Spencer and Spencer (1993), refers to "an underlying characteristic of an individual that is causally related to criterion-referenced effective or superior performance in a job or situation" (p. 9). This study focuses on three key components of competence: knowledge, skills, and readiness, as these are most relevant to student preparedness in a game design context. Research supports that



practice and knowledge acquisition improve task competency (Petric, 2002), while additional studies have shown that factors such as gender, anxiety, and attitude also influence competence-readiness (Ali, 2017; Bulut, 2017; Cocuk et al., 2016; Liu & Ni, 2015; Bayat, 2014; Tezkan, 2012; Hairuzila, 2008; McClenny, 2010; Nausheen & Richardson, 2010; Daly & Miller, 1975).

1.8.1 Analysis Phase

The initial phase commences with a rigorous needs analysis, where problem identification is undertaken to pinpoint the gaps and requirements for the Anim4Games Module. This process leverages expert consensus, utilizing robust methodologies such as the Fuzzy Delphi Method to understand educational needs thoroughly. The role of the researcher in this phase is to collaborate with experts to ascertain the precise academic requirements that the module will address. The outcome of this phase is a clearly defined set of needs for module development, which lays the foundation for the subsequent phases.

1.8.2 Design and Development Phase

The design phase integrates principles from the six disciplines of breakthrough learning (Pollock et al., 2010) and the Work Readiness Scale (WRS) (Caballero et al., 2011) to establish a strategic approach for the module content. This includes setting learning objectives, devising activities, and selecting appropriate instructional strategies and tools. The module's format, elements, and materials are crafted in the development phase, including preparing worksheets and assessment tools. In conjunction with other



subject matter experts, the researcher plays a pivotal role in strategizing and creating the content. The outcome is a set of validated main domains and frameworks that constitute the learning module, ready for implementation.

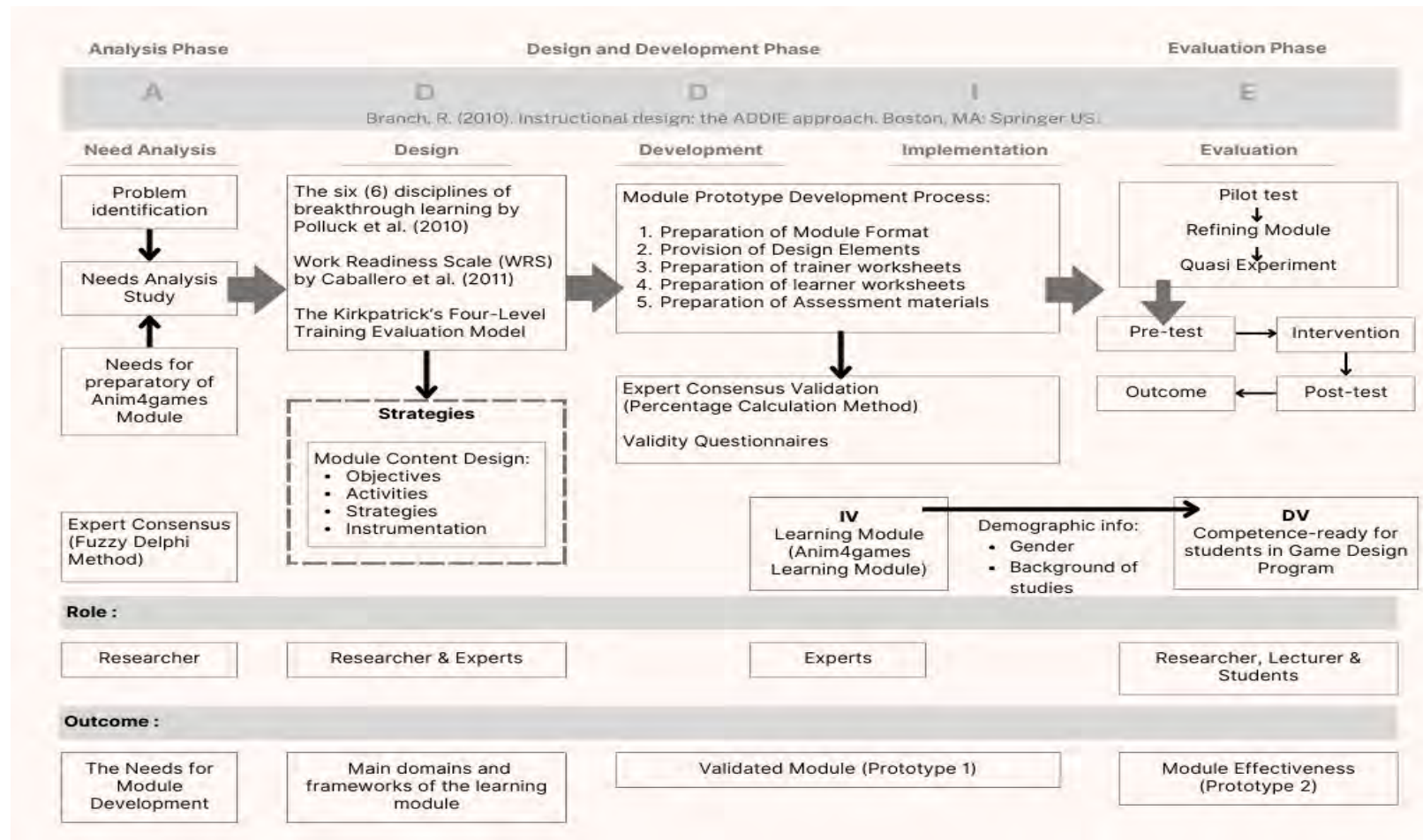
1.8.3 Implementation Phase

In this phase, the developed module prototype is brought into practice and undergoes expert consensus validation. The implementation process is critical for the functional deployment of the Anim4Games Learning Module within the educational setting. The evaluation phase is essential to ascertain the efficacy of the learning module. It commences with a pilot test to refine the module, followed by a quasi-experimental design that employs a pre-test, the intervention itself, and a post-test to measure outcomes. The Anim4Games Learning Module acts as the independent variable (IV), while the dependent variable (DV) is the level of competence-readiness for students in the Game Design Program. This phase also considers demographic variables such as gender and educational background. The researcher, lecturers, and students collaborate in this evaluative process, with students being the direct beneficiaries of the intervention. The outcome of this phase is the assessment of the module's effectiveness in enhancing student competence in game design, referred to as Prototype 2



Figure 1.5

Conceptual Framework of Design and Development



Adaptation by Branch (2009)



1.9 Operational Definitions

The present study has identified several important terms to define in the research context. The terms used in this study involve both independent and dependent variables measured through clearly defined instruments and indicators.

1.9.1 Anim4Games Self-Learning Module

This study defines the Anim4Games Self-Learning Module as a self-paced instructional package developed using the ADDIE instructional model (Analysis, Design, Development, Implementation, Evaluation) (Branch, 2009). It is designed to enhance students' knowledge, practical skills, and industry readiness in game animation.



In this context, animation refers to the controlled movement of digital elements based on core principles such as timing, spacing, anticipation, and ease-in/ease-out. Specifically, game animation differs from cinematic animation in that it must respond to user input and run in real time within a game engine (Seo, Lee, & Heo, 2018). This requires optimization for interactivity, responsiveness, and gameplay feedback.

Game Design refers to the planning and structuring of interactive experiences through gameplay mechanics, player objectives, levels, and storytelling techniques (Salen & Zimmerman, 2004). It focuses on the creative and experiential elements of games, differentiating it from game development, which includes coding and technical implementation.





The Anim4Games module integrates these domains through video tutorials, animation exercises, guided reflections, and assessments using Blender, Unity, Animate, and Photoshop tools. It supports self-directed learning and aligns content with key competencies in the Malaysian and international creative game industry (MDEC, 2018).

1.9.2 Competency readiness

Competence-readiness refers to a student's preparedness to perform effectively in game design and development roles. This study operationalizes competence-readiness across three measurable dimensions:

- I. Knowledge – Conceptual understanding of animation principles, in-game workflows, and integration with gameplay mechanics. Measured through pre- and post-intervention, multiple-choice questions were used.
- II. Skills – The ability to execute game-ready animations using relevant tools (e.g., Animate, Blender, Unity). This includes walk cycles, animation loops, object manipulation, and stylized movement. Assessed using expert-validated rubrics.
- III. Readiness – Work-related behaviours, mindsets, and self-confidence in performing animation tasks in a game development context. Measured using an adapted Work Readiness Scale (Caballero, Walker, & Fuller-Tyszkiewicz, 2011).





These elements reflect the broader view of competence proposed by Spencer and Spencer (1993), including knowledge, skills, and traits contributing to effective performance. The framework aligns with industry expectations (MDEC, 2018) for graduates entering the creative digital economy.

1.9.3 In-game Animation Knowledge

In-game animation knowledge refers to the student's theoretical grasp of how animation contributes to gameplay, feedback systems, and emotional engagement in interactive environments. It includes understanding:

- I. Functional animation principles (timing, spacing, anticipation, squash, and stretch)
- II. Real-time responsiveness in games,
- III. Differentiation between realism vs. stylization,
- IV. Technical integration of animation assets in engines like Unity.

This knowledge is assessed through scenario-based quizzes, conceptual mapping, and reflective questions embedded in the module. Misconceptions about animation for games versus films are addressed directly through module content (Seo et al., 2018).





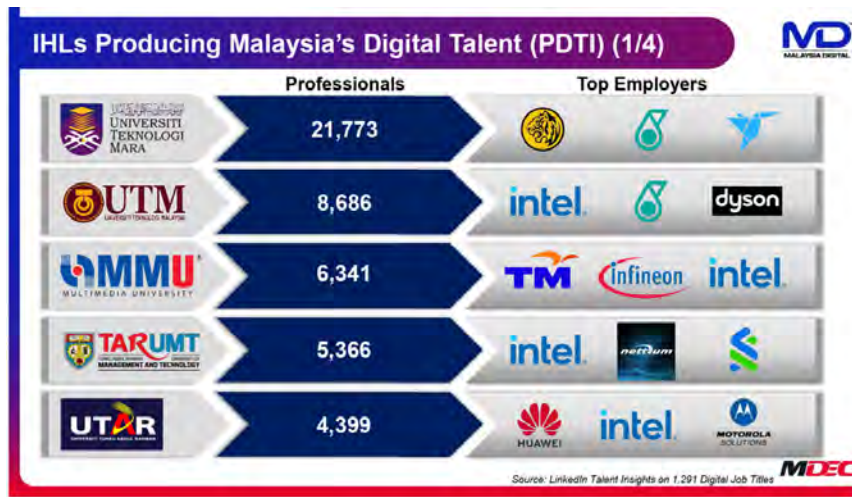
1.9.4 Game Design Students

In this study, game design students were selected using purposive sampling, a non-probability sampling technique where participants are chosen based on specific characteristics relevant to the research objectives (Palinkas et al., 2015). The main criterion for inclusion was enrollment in the Creative Game Design program at Universiti Teknologi MARA (UiTM). These students were selected because they represent a relevant and accessible population actively engaging with animation and game-related coursework, which aligns with the objectives of the Anim4Games Self-Learning Module.

UiTM was chosen due to its established reputation in creative technology education and commitment to developing digital content talent under Malaysia's national digital economy initiatives (MDEC, 2024). UiTM produced 21,773 digital professionals, the highest among the country's public and private institutions. Its graduates are actively employed by top tech companies such as Maybank, PETRONAS, and TNB, making it a strategic source of promising talent for Malaysia's digital creative industry. This reinforces the relevance of the study's target group in contributing to real-world game development ecosystems.

As the Creative Game Design program is still in its early development phase, UiTM students represent an ideal target group for intervention-based studies to enhance animation competency and industry readiness. UiTM was specifically chosen because it is recognized as a major contributor to Malaysia's digital talent pool.



Figure 1.6*UiTM Reputation in Creative Technology Education*

Adapted from Malaysia's National Digital Economy Initiatives (MDEC, 2024)

The Game design students in this study refer to first-year undergraduates enrolled in the Creative Game Design program at Universiti Teknologi MARA (UiTM), Malaysia. These students represent the target population for the Anim4Games module. They come from diverse educational backgrounds such as animation, multimedia, and computing, reflecting the field's interdisciplinary nature. These students are in the formative stages of learning and are developing core knowledge and skills necessary for creative content development. Their learning preferences are hands-on exploration, digital media fluency, and collaborative problem-solving (Jakubowski et al., 2010; Larsen et al., 2016).



1.10 Scope and Limitation of the Study

Game design embodies the intricate craft of formulating a game's core rules and thematic content. This creative process unfolds from the germination of a rudimentary game concept to the culmination in detailed documentation that encompasses all essential aspects of the game: conceptual, functional, artistic, and more (Bates, 2004; Rollings & Morris, 2003; Schell, 2008; Jakub et al., 2010). A robust game development curriculum integrates expertise from three principal domains: Game Technology, which lays the technical foundation; Game Art, which shapes the aesthetic and visual components; and Game Design, which weaves together the narrative and mechanics to create engaging gameplay. This multilateral synergy is encapsulated within the Creative Multimedia Programme Standards as delineated by the Malaysia Qualification Framework (MQA, 2015).

In the context of this study, the scope is thus limited to examining how these interdisciplinary facets are woven into the educational tapestry of game design programs. The limitations are acknowledged because the study focuses on aligning the educational framework with the MQA standards, explicitly concerning the three disciplines above. The research will not extend into the operational intricacies of the game industry or the subjective artistic evaluation of game content. However, it will remain confined to the educational strategies and pedagogical structures that underpin game design as an academic discipline.

This study delves into integrating three fundamental disciplines within game development: Game Technology, Game Art, and Game Design, as specified by the





Creative Multimedia Programme Standard of the Malaysia Qualification Framework (MQA, 2015). Within this framework, the specialization in Animation and Visual Effects encompasses a broad array of animation courses, equipping graduates with the skills to pursue careers in game design, among other roles (MQA, 2015). The computer game design field presents an opportunity to engage with the forefront of technological advancements in computer programming, graphic design, and animation (Schaefer & Warren, 2004; Jakub et al., 2010).

Although animation is a common thread linking various media, including movies and video games, this study will focus on its application within game design. While recognizing that the principles and tools of animation are universally applicable across different media, the research will particularly examine the nuances and specific requirements of animation as applied to video games. The scope of this thesis is thus limited to the educational methodologies that inform the teaching of animation within the context of game design programs aligned with the standards set forth by the MQA. It will not extend to the broader aspects of animation in film or other non-interactive digital media.

The "Anim4Games Self-learning Module" looks at first-year students enrolled in game design programs, focusing on a demographic at the incipient phase of their academic path. The module is meticulously crafted to enhance the knowledge of in-game animation and cultivate a robust digital skill set within this student group. Additionally, the module seeks to evaluate the preparedness and competency of students from diverse academic foundations, preparing them to meet the dynamic needs of the gaming industry with a particular focus on in-game animation.

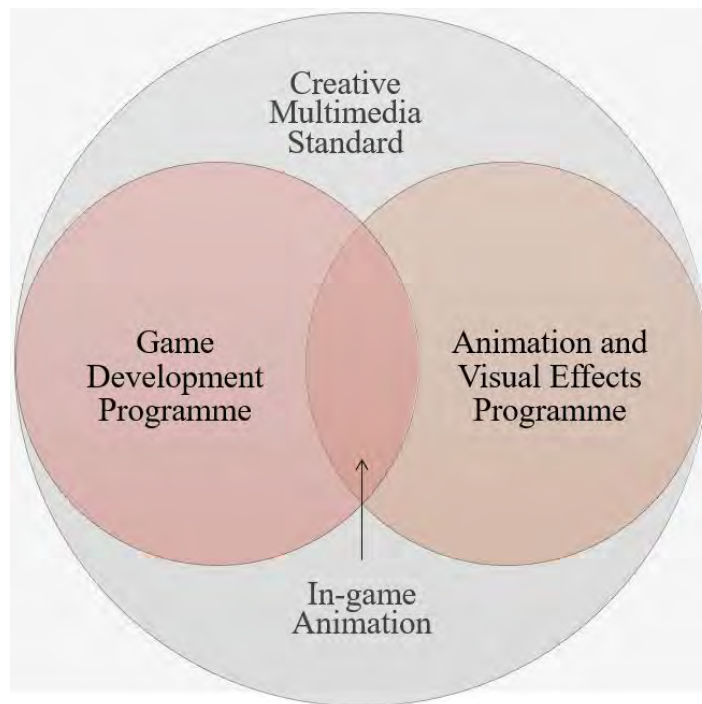


The research is expected to provide valuable insights to close the educational gap between game design and animation techniques, thereby advancing the efficacy of self-learning modules in game design education. This study holds particular relevance as it endeavors to garner validation for the module from game design and development experts within Malaysian Institutes of Higher Learning (IHLs). Through this scholarly validation, the module aims to contribute substantively to the pedagogical resources available to students, equipping them with the necessary skills to excel in the competitive field of game design.

The Venn Diagram in Figure 1.7 shows the scope of the research areas for this study. The figure appears to be two overlapping circles (Game Development Programme & Animation and Visual Effects Programme) within a larger encompassing circle (Creative Multimedia Standard). The intersection between the Game Development Programme and the Animation and Visual Effects Programme is labeled 'In-game Animation.' This overlapping area highlights the multidisciplinary nature of animation within games, indicating that it is a shared domain of knowledge and skills pertinent to both programmes. It underscores that in-game animation is informed by principles and techniques from game development and animation/visual effects disciplines. The diagram succinctly illustrates the shared space between game development and animation, emphasizing the interdisciplinary nature of in-game animation and its relevance to educational programs within the scope of creative multimedia standards.

Figure 1.7

Scope of the research areas of the study



The research is limited to a few students enrolled in game design programs because game design programs are still new in the IHL in Malaysia. However, it is essential to acknowledge the limitations inherent in this approach. The study focuses predominantly on first-year students in game design programs, which might not fully capture the complexities and challenges students face at more advanced stages of their education. Additionally, the scope of the study is confined to the context of Malaysian Institutes of Higher Learning (IHLs), which may have specific technological and educational infrastructures that differ from those in other regions. This geographical focus could potentially influence the generalizability of the study's findings to a broader, international context. Lastly, the relatively new nature of game design programs in Malaysia may limit how much the study can draw on a wide and diverse pool of student experiences and outcomes.



The research is limited to a few students enrolled in game design programs, primarily from public higher education institutions (HEI) in Malaysia. This focus is based on two key justifications. First, HEI institutions have increasingly incorporated Creative Multimedia and Game Design programs aligned with the Malaysian Qualification Framework (MQA, 2015), making them representative of the national curriculum standards in this field. Second, the development of game design as an academic discipline remains relatively nascent in Malaysia, with a limited number of IPTS (private institutions) offering comprehensive, MQA-aligned game design degrees (Zulkifli & Mokhtar, 2020; MDEC, 2021).

Furthermore, public institutions are more accessible regarding administrative collaboration, ethical clearance, and logistical support for research involving students and faculty. As noted by Mustapha and Abdullah (2020), studies conducted in HEI often benefit from established research infrastructure and access to targeted academic cohorts. Given these contextual realities, focusing on HEI students enhances the study's feasibility while allowing for meaningful insights into competency readiness in game design education. Nevertheless, this limitation may affect the generalizability of findings to private or international institutions with differing curricular emphases or resources.





1.11 Significance of Research

This study offers a different strategy that provides a supplementary approach to standard practice in game design program teaching and learning. In general, this research will benefit several parties.

1.11.1 Game Design education program

The significance of this study lies in addressing the issue of education in animation for games, which is crucial for game design education. By establishing a set of design principles for a learning module called 'Anim4Games,' this study aims to provide a comprehensive education in animation techniques for new enrolments in game design programs to enhance their academic survival skills. The study aims to analyze the competencies of animation for game knowledge and skills using the Anim4Games Self-learning module and identify the impact of this module on enhancing the competencies of new students enrolling in game design programs.

In Malaysia, only a few public Institutions of Higher Learning (IHL) offer game design programs, video game design, or game development programs. This study's findings are significant in improving curricula and syllabus design for game design studies, specifically in the area of animation that necessitates game outputs. The study further reveals that animation skills cover almost 90% of the necessary skills in game design development. The design of course content is the core of cultivating students' readiness ability. Based on a conceptual understanding of animation for games and skill set creation, there is a need to design and develop macro teaching content suitable for





students in game design learning subjects of arts and animation. Emphasize cultivating students' relevant abilities in curriculum design and implementation in our daily teaching to meet the needs of the current society.

Based on a conceptual understanding of animation for games and skill set creation, there is a need to design and develop macro teaching content suitable for students in game design learning subjects of arts and animation. Emphasize cultivating students' relevant abilities in curriculum design and implementation in our daily teaching to meet the needs of the current society. The final version of the Anim4Games Self-Learning Module developed, validated, and evaluated through this study is provided in the Appendix section as a key instructional outcome supporting competency readiness in game design education. The insights gained from this research will also be valuable for policymakers and accreditation bodies seeking to revise national curriculum standards, as it highlights the necessity of embedding animation for games as a recognized academic component.

1.11.2 Game Design industries and practitioners

The significance of this research extends beyond academic parameters, positioning itself as a pivotal catalyst for the enrichment of Malaysia's gaming industry. By cultivating a generation of adept animators through the Anim4Games Self-learning Module, the study aims to bolster the workforce with proficient individuals and spur innovation within the gaming sector. The module is strategically designed to mitigate the educational divide between the animation practices in film and those in video game design, fostering a harmonious blend of skills adaptable across these creative platforms.





The implications of this study are far-reaching, with the potential to influence both the commercial landscape and the pedagogical methodologies within Institutes of Higher Learning (IHL) in Malaysia. By embedding a comprehensive understanding of animation techniques within the curriculum of game design and development programs, the findings of this study promise to serve as an invaluable asset for both the industry and academic spheres. Such a symbiotic enhancement of skills and knowledge is anticipated to elevate the caliber of educational offerings and align them more closely with the needs of the gaming industry.

Ultimately, the research contributes substantively to the evolution of the game design industry in Malaysia. The study aims to lay the groundwork for a robust and dynamic sector capable of competing globally by equipping students with advanced academic survival skills and practical competencies. The 'Anim4Games' Self-learning Module, therefore, represents not just an educational tool but a strategic investment in the future of Malaysia's creative technological landscape.

1.11.3 Lecturers / Tutors / Trainers / Students

The findings of this study are poised to provide valuable insights into the state of competence-readiness among students within game design programs. The Anim4Games self-learning module is a transformative educational tool, fostering increased engagement among students, trainers, and lecturers in this practical intervention. Beyond its immediate instructional benefits, the module is an expansive learning resource, offering broader pedagogical advantages that can be realized through its application.





It is proposed that forming interdisciplinary teams encompassing students, lecturers, and trainers from the game development spectrum could significantly enhance the collaborative interplay of background knowledge and practical skills. Such collaboration is instrumental in circumventing the potential for expensive setbacks and project failures. Moreover, including students from varied academic disciplines is advocated to enrich the collective competency in animation for game design, thereby ensuring a more versatile and well-prepared student body.

The research underscores the importance of a diverse educational approach for all stakeholders: the animation and gaming industries, game design and development programs in Institutions of Higher Learning (IHL), and educators and students. This comprehensive perspective will allow a more nuanced evaluation of the module's effectiveness, particularly in specialized training environments for junior animation industry animators with a game design focus.

For lecturers, tutors, trainers, and students, the significance of this research lies in its potential to enhance educational practices and outcomes. The module is anticipated to catalyze improved teaching strategies, learner engagement, and, ultimately, student success in game design. By leveraging the insights and tools provided by the Anim4Games module, educators can offer a curriculum that is both current and in direct alignment with the needs of the industry. At the same time, students can develop a skill set that prepares them for the demands and opportunities of the professional world.





1.12 Summary

This research emerges in Malaysia's rapidly expanding gaming and animation landscape, where the fusion of creativity and technology presents unprecedented opportunities. The data obtained from the Malaysia Digital Economy Corporation (MDEC) in 2018 illuminates the landscape of higher education in this field, indicating that no fewer than twenty-two (22) Malaysian Institutions of Higher Learning (IHLs) have developed curriculum offerings in animation. Given these figures, it is plausible to consider Malaysia a potential leader in animation education within the Southeast Asian region. The escalation in the number of animation graduates enriches the talent pool, potentially elevating Malaysia's status in the competitive arena of the global video game market.



In anticipation of such growth, it becomes imperative for both the computer animation industry and academic institutions to proactively engage in strategies that support professional growth through continuous learning and development opportunities. Such a strategy should emphasize reskilling, upskilling, and retraining in animation and game design, tailored to be accessible throughout various stages of a professional's career trajectory.

However, this expansion also reveals challenges in ensuring quality, relevance, and alignment of educational offerings with the dynamic needs of the global creative industries. Despite the growing number of programs, mismatches between academic curricula and industry practices persist, particularly in game-specific animation competencies such as real-time responsiveness, asset integration in game engines, and





procedural animation techniques. Therefore, higher education must go beyond quantity to emphasize pedagogical quality and learner-centered innovation.

The initial chapter of this thesis systematically presents the groundwork of the study. It commences with a comprehensive delineation of the problem statement, advancing to define the study's aims and objectives. Subsequently, it presents the formulated research questions and hypotheses. The chapter further introduces a conceptual framework meticulously designed to steer the research. Additionally, it meticulously defines the operational terms vital to the study, outlines its delimited scope, and elucidates the anticipated contributions of the research to the academic and professional sectors.



Chapter One has also laid the theoretical foundations for exploring how structured self-learning tools, like the Anim4Games module, can improve the competency readiness of game design students in Malaysian institutions. Central to this thesis is the integration of four key theoretical lenses: the ADDIE Instructional Design Model, Self-Directed Learning (SDL), Competency-Based Education (CBE), and Rasch Measurement Theory. These frameworks work in synergy to inform both the design and evaluation of the module, offering a solid basis for educational impact analysis.

In addition, the chapter outlined the practical relevance of the study in bridging the gap between academic instruction and industry demands. This includes addressing the SEA regional talent shortages in game design and animation, as identified by recent MDEC reports and the SEA Game Talent Economics Report (2024). The study





positions the Anim4Games module as a pedagogical tool and a scalable intervention capable of contributing to Malaysia's vision of becoming a creative digital hub in Southeast Asia.

As we progress to Chapter Two, the thesis will explore select theoretical constructs and models germane to this field of study. A critical review of previous scholarly work relevant to the current research will complement the exploration. Such a review aims to anchor the study within an established academic dialogue and highlight the gaps and opportunities this research seeks to address, thereby contributing to the evolution of knowledge in the interdisciplinary sphere of game design and animation. This foundation ensures that subsequent chapters can build upon a well-defined context, linking theoretical constructs with practical solutions to improve educational practices in creative digital disciplines.

