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Flex Your Knowledge, Play Like a Reflex: An UNO-Inspired Card Game for Anatomy Education

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ABSTRACT

Learning anatomy can often be a daunting task due to the vast amount of information and memorisation involved. We introduce *An UNO in Anatomy*, an anatomy-themed card game designed to make learning anatomy more engaging and accessible. This game adapts the mechanics of the popular UNO card game, incorporating anatomical knowledge into each card's design. Through action cards, wild cards, and anatomy-related challenges, this educational tool encourages players to think critically about human anatomy while having fun. This article presents the game concept, its potential educational impact, and suggestions for future development to improve learning outcomes.

Keywords: *Anatomy education, Gamification, Educational tools, Card game, Interactive learning*

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INTRODUCTION

Teaching human anatomy traditionally involves extensive memorisation, which can lead to disengagement among students, particularly those without a strong interest in medical sciences (1). The challenge lies in making this essential subject accessible and engaging, not only for medical students but also for the general public. Educational tools that incorporate play-based learning have demonstrated positive outcomes in improving knowledge retention and stimulating interest in subjects that are often perceived as difficult (2).

Learning human anatomy is often perceived as difficult due to the complexity and volume of information required (3). This challenge is exacerbated by a lack of engaging educational tools that make learning anatomy more approachable, particularly for younger audiences and those outside the medical field. While effective, traditional teaching methods may not always captivate all learners, leading to poor retention of essential anatomical knowledge. There is a need for an innovative approach that combines education and engagement to facilitate the learning of anatomy in a manner that is both effective and enjoyable (4).

An UNO in Anatomy is an innovative card game designed to blend entertainment with education (5). Modelled after the classic UNO card game, it leverages familiar mechanics to introduce anatomy-related content in a playful yet informative way. This game aims to enhance learning through repetition, visual engagement, and critical thinking, making it a valuable addition to both medical education and public health awareness initiatives. The game's core structure combines anatomical imagery and facts with the competitive, interactive format of UNO, allowing for a dynamic learning experience that appeals to a broad audience.

The primary objective of this project is to develop an interactive card game that sparks interest in anatomy by utilising familiar game mechanics. The game aims to provide a structured yet enjoyable method for players to learn about anatomical structures and clinical conditions. Additionally, it seeks to support anatomy education by incorporating images, facts, and health-related information into the game format, with quick-response (QR) codes providing links to further exploration. Ultimately, the game's goal is to encourage both students and the public to engage more deeply with the study of the human body.

METHODOLOGY

An UNO in Anatomy follows the structure of the traditional UNO game but incorporates an educational twist that transforms each card into a learning tool focused on human anatomy. The number cards in the game represent specific anatomical components, including arteries, veins, nerves, lymph nodes, muscles, organs, connective tissues, embryonic origins, and cells. Each of these cards provides a simple yet informative explanation of the anatomical structure or function it represents, offering players a clear understanding of key anatomical elements as they progress through the game.

A basic understanding of human anatomy is recommended for players to fully engage with the educational content of the game. For younger players or those without prior exposure to anatomy, a simplified version of the game or guidance from an educator may be beneficial. The game is primarily designed for individuals aged 10 years and above, catering to medical students, healthcare professionals, and the general public interested in anatomy.

The action cards (such as skip, reverse, and +2), which traditionally affect gameplay in UNO, have been innovatively designed to feature pathologies specific to each body system (Figure 1). Each action card includes a catchy phrase that links the game mechanics to the pathology. For example, a skip card in the musculoskeletal system might focus on osteoporosis, with the phrase "Fragile bones from osteoporosis cause a sudden collapse, skipping the next player's turn while they regain balance." Alongside the phrase, the card provides a brief explanation of the pathology, including its warning signs or symptoms, as well as possible treatments. In some cases, symptoms are highlighted instead of warning signs, adding variety to the educational content.

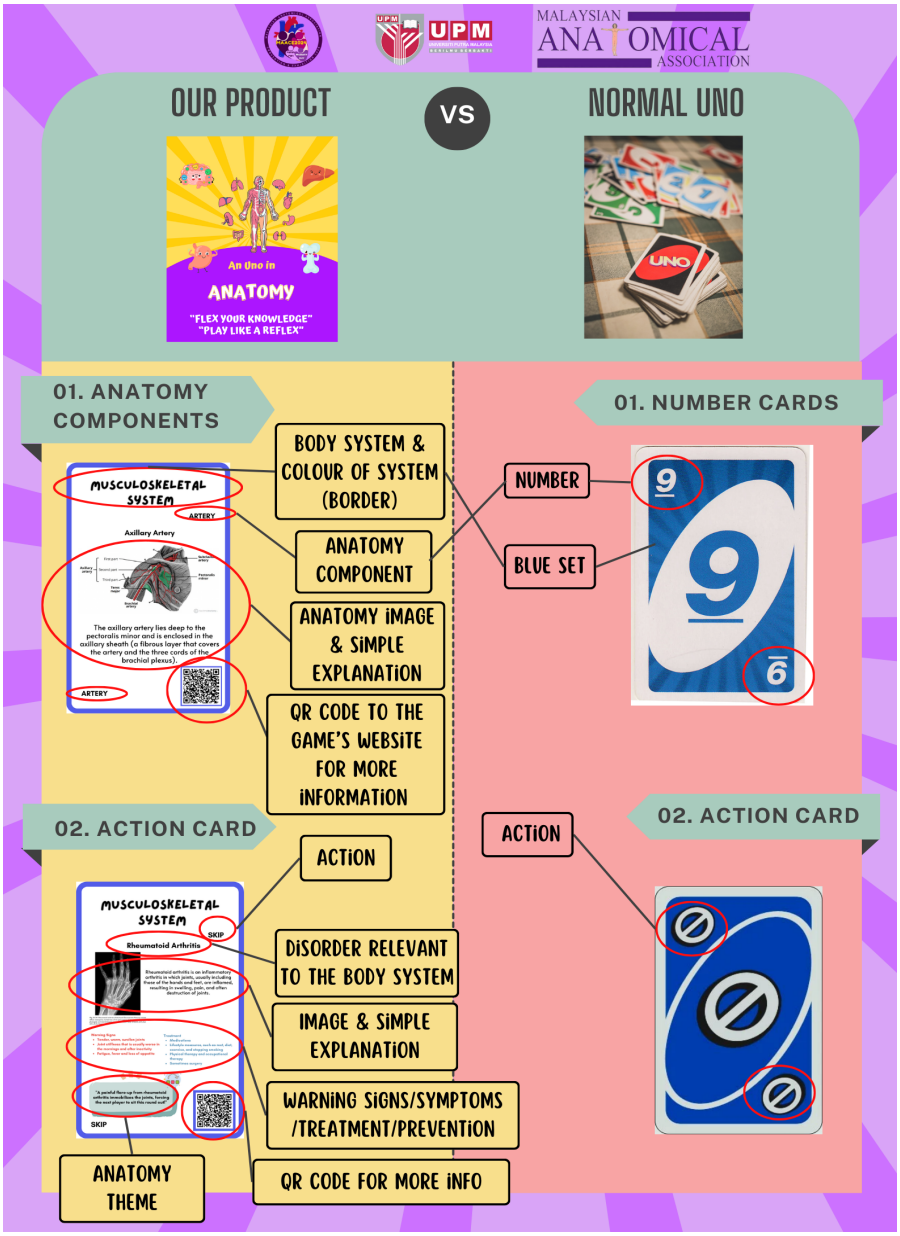

Figure 1: UNO Anatomy action cards present body system–related conditions (e.g., osteoporosis) with key symptoms and treatments, helping reinforce anatomy and clinical concepts during gameplay.

A unique feature that underscores the game's suitability for public education is the special twist introduced to the wild cards (Figure 2). While ordinary wild cards promote elements of a healthy lifestyle, such as healthy eating and regular exercise, the wild +4 cards highlight common ailments in Malaysia, such as obesity and hypertension. These cards provide information on the symptoms or warning signs, prevention strategies, and potential complications or implications of these conditions. Each wild and wild +4 card includes a catchy phrase to maintain the game's fun and engaging atmosphere, while also imparting important health knowledge. Moreover, QR codes on the wild and wild +4 cards direct players to the official Ministry of Health (MOH) website, offering additional resources to support public health education.

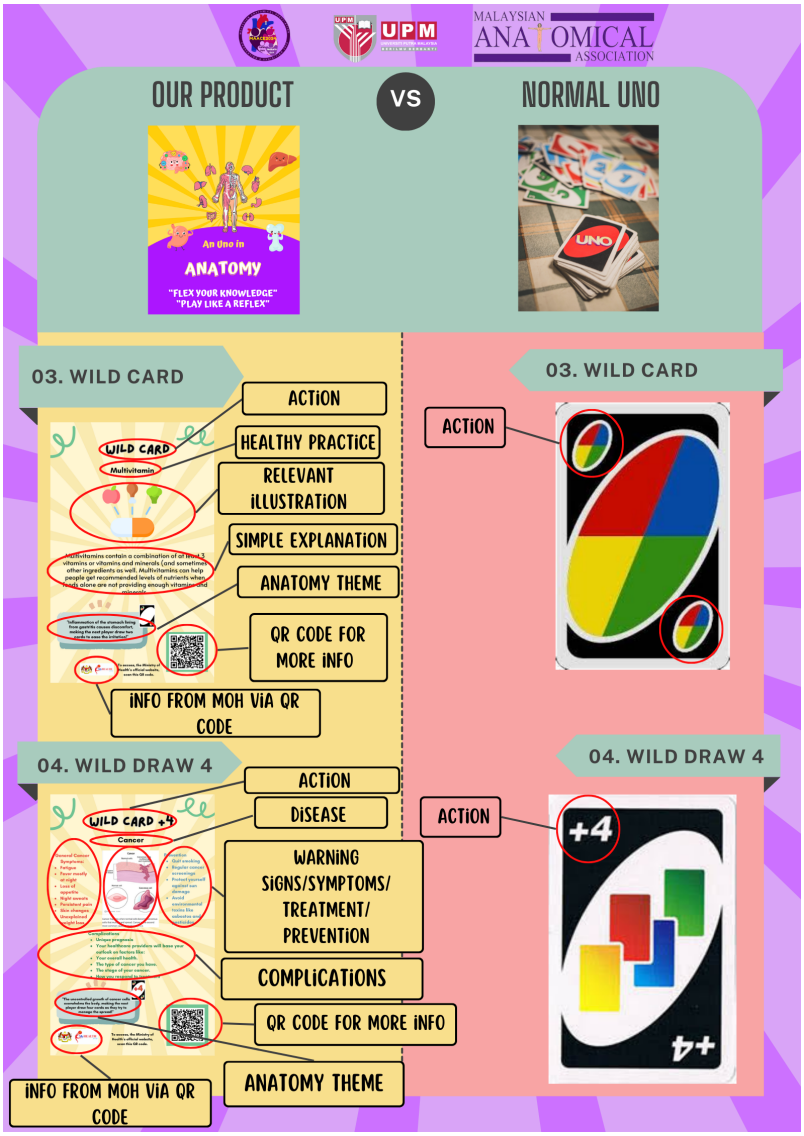

Figure 2: Wild cards in UNO Anatomy promote healthy habits and highlight common Malaysian health issues like obesity and hypertension, with QR codes linking to official MOH resources to support learning and engagement.

The QR codes are featured on all game cards, allowing players to access deeper content beyond the brief facts provided on the cards. This integration of technology ensures that players can explore more comprehensive anatomical and health-related information, fostering both curiosity and a deeper understanding of the human body. Overall, *An UNO in Anatomy* merges entertainment with education, offering an engaging and informative learning experience for both medical students and the public.

The QR codes integrated into the game cards provide players with access to detailed and reliable information about human anatomy and related health topics. The information linked to the QR codes on the number cards is sourced from the following reputable websites: Teach Me Anatomy, Kenhub, and Merck Sharp & Dohme (MSD) Manuals Consumer. These resources are recognised for their accuracy and accessibility in anatomy education.

Similarly, the QR codes on the action cards provide information sourced from Teach Me Anatomy and MSD Manuals Consumer. These platforms were chosen for their ability to present clinical and pathological concepts in an engaging and easily understandable manner. This approach ensures that the educational content of the game is backed by reliable and authoritative references, promoting both accuracy and trustworthiness.

The anatomical information and illustrations presented on the cards were carefully curated from reliable and authoritative resources to ensure accuracy and educational value (6–10). The content was reviewed and verified by subject matter experts in anatomy and pathology from the Department of Human Anatomy, Universiti Putra Malaysia, to ensure alignment with current academic and clinical standards.

EDUCATIONAL BENEFITS

The educational value of *An UNO in Anatomy* lies in its ability to engage players through interactive gameplay while providing meaningful anatomical knowledge. By using the familiar UNO framework, the game introduces educational content in a way that is fun and approachable, helping to maintain players' interest over time (11). The game's visual aids, such as color-coded systems and anatomical illustrations, support knowledge retention by reinforcing the association between visual cues and anatomical concepts. Additionally, the interactive nature of the game encourages players to engage with one another, fostering a collaborative learning environment (12). This social aspect enhances understanding as players discuss and exchange anatomical knowledge during gameplay.

Another significant benefit of the game is its role in raising public health awareness (11). The QR codes printed on the cards link to comprehensive information on anatomy and related health issues, allowing players to access up-to-date medical knowledge and deepen their understanding. This feature makes the game particularly useful as a tool for promoting health literacy among the general public. The game also serves as a valuable resource for medical students, offering a way to review key anatomical concepts in a more relaxed and informal setting.

STRENGTHS AND LIMITATIONS

One of the key strengths of *An UNO in Anatomy* is its broad appeal. The game is designed to be accessible to both the general public and medical students, making it a versatile tool for education. The combination of entertainment and education allows players to engage with anatomy in a low-pressure environment, helping to overcome the common perception that learning anatomy is overly complex or boring (13). The game can also be continuously updated with new content, ensuring that the clinical and anatomical information presented remains relevant and accurate. Additionally, the game's ability to foster group interaction encourages cooperative learning, which has been shown to improve knowledge retention (5).

However, the game also has limitations. The complexity of some anatomical concepts may make the game less suitable for younger audiences, particularly children under the age of 10. Furthermore, the educational content is limited to what can be printed on the cards, which may not provide the depth of understanding required for more advanced learners, such as medical professionals. To address these limitations, supplemental materials or additional study resources may be necessary to provide a more comprehensive learning experience.

Some of the diagrams used in the game were sourced from publicly available internet resources and are intended solely for non-commercial, educational purposes. The game is designed as a prototype for teaching anatomy and is not intended for commercial distribution or profit. We acknowledge the need to ensure compliance with copyright laws and will take steps to replace borrowed materials with original or properly licensed content should the game move towards broader dissemination.

SUGGESTION FOR FUTURE DEVELOPMENT

There are several potential areas for future development of *An UNO in Anatomy*. A digital version of the game could include enhanced visual features, such as 3D anatomy models and interactive quizzes, providing a more immersive learning experience. Additionally, this digital format could offer real-time updates to the game's content, ensuring that players always have access to the most current medical knowledge. Future editions of the game could also be tailored to specific audiences, such as medical students or children, with customised content that meets their unique learning needs.

Collaboration with reputable online health databases, such as MSD Manuals (consumer versions), would further enhance the game's educational value. These collaborations could allow players to access detailed health information directly from the game, providing a more in-depth learning experience. Moreover, introducing specialised card sets that focus on specific diseases or clinical conditions would increase the game's applicability in more advanced medical education contexts.

CONCLUSION

An UNO in Anatomy - Flex Your Knowledge, Play Like a Reflex offers an innovative approach to anatomy education by combining entertainment with learning. By gamifying anatomical concepts, the game makes learning more accessible and engaging for a broader audience, from medical students to the general public. Through its interactive gameplay and educational content, the game has the potential to improve knowledge retention, promote health literacy, and enhance the overall learning experience. As we continue to develop and expand this tool, we believe it will have a significant impact on the way anatomy is taught and understood in both educational and public health contexts.

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