

Noah Martin¹, Paul Chahal¹, and Raj Narnaware²

1. Faculty of Health and Community Studies, MacEwan University, Edmonton, Alberta, Canada, T5J 4S2
2. Faculty of Nursing, MacEwan University, Edmonton, Alberta, Canada, T5J 4S2

Introduction

- Human Physiology is a foundational course in Physical Education. Kahoot is one of the learning technologies that students enjoy that can be used to assess and reinforce content of the Physical Education students (Bice et al., 2016).
- Retrieval practice is reported to be an efficient method of enhancing the retention of the physiology content (Dobson, 2013). There is growing concern that students are not retaining the essential bioscience knowledge in this course over time (McVicar et al., 2015).
- Numerous studies have investigated knowledge retention and its application in medicine, allied health, and nursing discipline (Narnaware 2021). There is a lack of such studies in Physical Education. The present study investigates knowledge retention of cell membrane transport in human physiology for kinesiology students.

Purpose of the Study

The purpose of the study was to monitor and improve the acquisition and retention of human physiological knowledge of Physical Education students. Over eight weeks, content retention was evaluated for the cell and plasma membrane transport for first-year Physical Education University Transfer students. The study aimed to investigate the effects of an interventional retrieval practice strategy using Kahoot quizzes.

Methods

- The present study was conducted in the Fall 2023 semester with a human physiology Physical Education section of 48 students. Quizzes were created using an online platform called Kahoot (Kahoot Inc., Oslo, Norway) to assess content reinforcement of the cell membrane transport over eight weeks. The students were not informed about the quizzes in advance.
- Between nine and ten multiple-choice questions were given for each quiz. Quizzes were given for weeks 1, 2, 3, 4, 6, and 8. New sets of questions were used for each week's quiz.
- Data were statistically analyzed using SPSS II, and means were compared using 2-sample t-tests. The scores are described as the mean and standard deviation (SD) and are presented in Table 1 and Figure 1. Statistical significance was set at $P < 0.05$ for all tests.

Results

- One week after the coverage of the cell membrane transport unit (week 1), students scored 58.9% (Table 1).
- There was a significant decline in the performance every week (except week 3) after week 1. The highest content retention was at week 3. This was the week for a midterm exam.
- The content retention stabilized between an approximate percentage of 40 to 43% (Figure 1). In comparison to week 1 the performance decrement was approximately 16% for week 3 and the lowest drop was about 32% a week after the midterm (week 4).

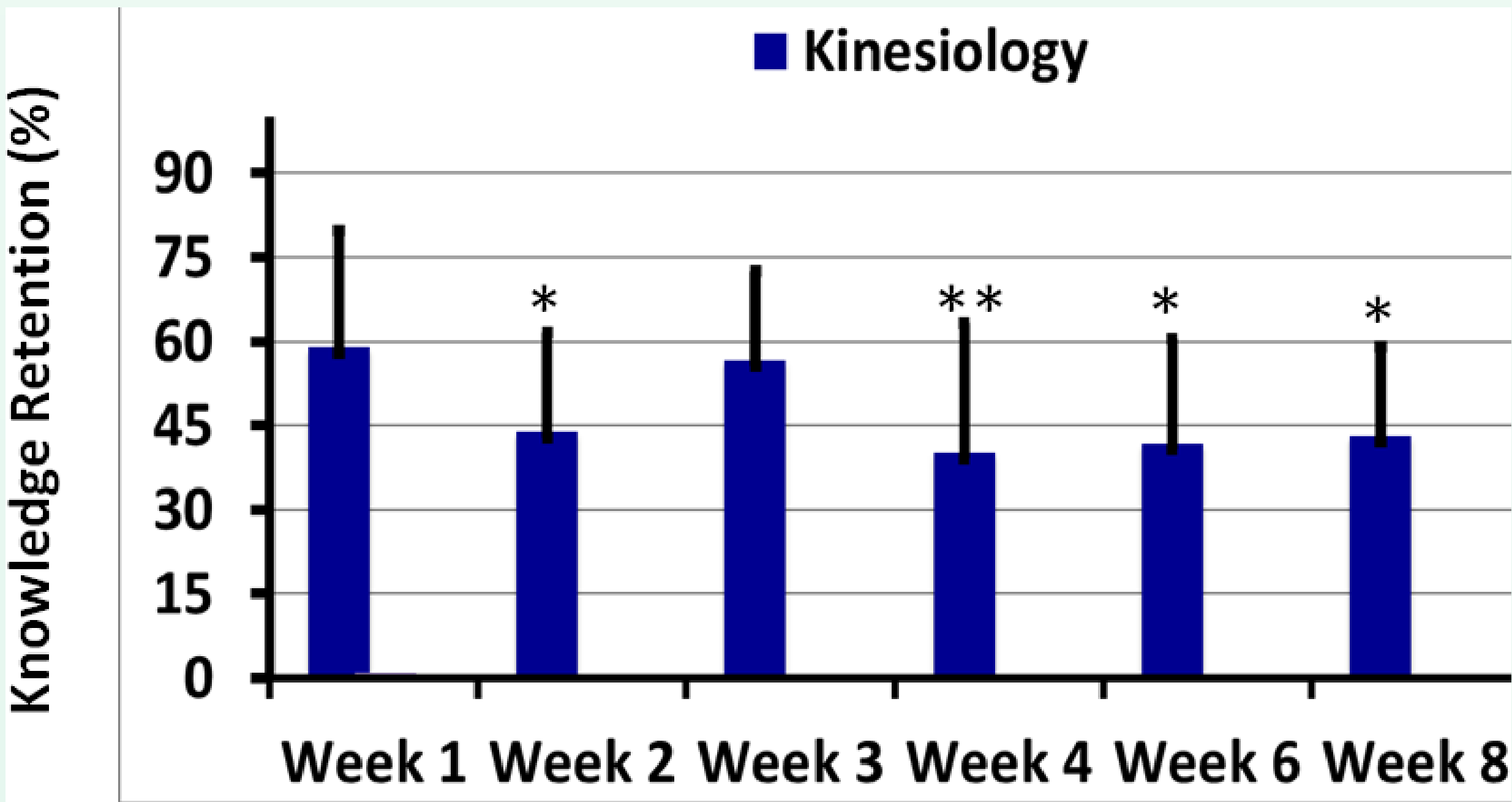


Figure 1. Knowledge Retention of the Cell Membrane Transport by Physical Education Students Over Eight Weeks. Compared to week 1; * $P < 0.05$, ** $P < 0.02$

Table 1. Percent Change from Week 1 in Knowledge Retention of the Cell Membrane Transport Over Eight Weeks for Physical g Students

Organ System	Percent (%) Change in Knowledge Retention					
	Week 1	Week 2	Week 3	Week 4	Week 6	Week 8
Cell Membrane Transport	100	74.5*	86.3	67.9**	69.3*	73.3*

Discussion & Conclusion

- Results show that the knowledge retention was observed to be week-specific, highest in weeks one and three and lower for other weeks. Therefore, content reinforcement can be used as an interventional strategy to improve long-term knowledge retention in Physical Education University Transfer students.
- Retrieval practice such as Kahoot quizzes are known to be an efficient method of enhancing contented retention of physiology (Dobson, 2013). There was a gradual improvement after week 4. The results indicate that the repetitive content reinforcement maintained the drop to about 68% to 73%.
- The knowledge retention for the Physical Students was less than the results reported by Narnaware for the nursing students. The difference could be due to the different teaching strategies used in both courses, the time of the day of the course, and the background preparation of the students. The nursing program is highly competitive and may have students with a higher overall GPA compared to Physical Education program.
- Kahoot quizzes as an assessment and teaching tool appears to be successful for along with other evidence-based learning strategies to maintain content retention for Physical Education students.

Acknowledgment

- Funding for this project was provided by the Faculty of Health and Community Studies, MacEwan University, Edmonton, Canada

References

- Bice, MR, Carey J, Brown GA, Adkins M, and Ball JW (2016). The use of mobile application to enhance learning of the skeletal system in introductory anatomy & physiology students. NAKHE, Vol. 27, Number 1, 16 - 22.
- Dobson, JL (2013). Retrieval practice is an efficient method of enhancing the retention of anatomy and physiology information. Adv Physiol Educ 37: 184-191.
- McVicar A, Andrew S, and Kemble R (2014). Biosciences within the pre-registration (pre-requisite) curriculum: An integrative literature review of curriculum interventions 1990 – 2012.
- Narnaware, Y. (2021). Never Heard That Before! Bioscience Knowledge Retention in Undergraduate Nursing Education- Current Topics. Human Anatomy and Physiology Society Educator, HAPS Educator Journal, 25 (2), 77-83.