

The Effect of Kahoot Web-Based Learning on Learning Skills of Pharmacy Students: The Trend in Clinical Pharmacokinetics Course for 2 Generations

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ABSTRACT

Background: Kahoot is a web-based learning that uses worldwide in the education field. From the review literature, lecture with a Kahoot web-based learning will improve the learning skill. However, there have been a few studies of using Kahoot web-based learning in pharmacy education. Therefore, the aim of this study is to compare pre-and post -learning skill using Kahoot web-based learning and observe the trend of effect for 2 generations. **Method:** Pre-and Posttest was established in Clinical Pharmacokinetics class of 5th year Pharmacy Students for 2 consecutive generations. Before class, the students did the questionnaire to evaluate learning skill and then this group was beginning to enroll the class using Kahoot web-based learning. The 8 dimensions of learning skills; Literacy, Numeracy, Reasoning, Creative problem solving, Critical thinking, Collaborative, Communication and Computing were evaluated. The trend of effect was observed. **Results:** The data from 21 Pharmacy Students (11 from year 2016, 10 from year 2017) who enroll Clinical Pharmacokinetics course in topic "Therapeutic Drug Monitoring of Aminoglycosides" shown that improved of 8 dimension skills scores after learning with Kahoot web-based as follow (Mean \pm SD); Literacy (3.29 \pm 0.64 vs 4.19 \pm 0.40), Numeracy (3.24 \pm 0.83 vs 4.05 \pm 0.50), Reasoning (3.29 \pm 0.56 vs 4.19 \pm 0.40), Creative problem thinking (3.05 \pm 0.59 vs 4.19 \pm 0.60), Critical thinking (3.10 \pm 0.70 vs 4.10 \pm 0.62), Collaborative (3.19 \pm 0.75 vs 4.19 \pm 0.40), Communication (3.24 \pm 0.62 vs 4.24 \pm 0.44) and Computing (3.14 \pm 0.73 vs 4.00 \pm 0.62). The separate analysis results had the same trends. **Conclusion:** From the results, Kahoot web-based learning could improve learning skill in Pharmacy Students. The effects consist in 2 generations. However, the confirmation study in the large group also needed.

Key words: Kahoot, Web based learning, Learnings skill, Clinical Pharmacokinetic cause.

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INTRODUCTION

Pharmacy education is now being changed by the current of social dynamic motivation. In the twenty –first century, the characteristic of the students are changed. The ideal characteristics of the students who will survival in twenty-first century have to get these basic 5 standard skills as follow; 1. Problem solving and decision making, 2. Creative and critical thinking, 3. Collaboration, communication and negotiation, 4. Intellectual curiosity and ability to find, select structure and evaluate information. 5. Motivation to be: an independent self-starter, lifelong learners.¹

Kahoot is the learning web based original from Norway. It is game-based learning that currently has more than 50 million users in 180 countries. The kahoot model is designed for use in classroom or other places with creating questions by anyone, any subjects and any ages of learners, since it can be able use by any device such as Lab-top Desktop or smartphone with internet access.

Clinical Pharmacokinetics is one of the difficult subject in pharmacy students' aspect. According to difficult content and many mathematic formulas, the most student



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complaint about learning this subject. With the proposed capacity of kahoot web-based learning, this study was aim to compare pre-and post -learning skill using Kahoot web based learning and observe the trend of effect for 2 generations.

MATERIALS AND METHODS

Learners

The 5th year's pharmacy students, Faculty of Pharmacy, Silpakorn University in Academic year 2016 and 2017 who were registered Clinical pharmacokinetics course.

Process

This study was performed in the routine topic "Therapeutic Drug Monitoring of Aminoglycosides" which contain for 2 h. Before the class begin pre-test questionnaire with 5 Likert scales (score 1 to 5) for the 8 dimension skills (Literacy, Numeracy, Reasoning, Creative problem solving, Critical thinking, Collaborative, Communication and Computing) modified from the faculty of Education were distributed to 2 generations of the students (2016, 2017). During teaching of this topic in class, kahoot web-based learning was used. After the end of this topic in the class, post-test for 8 dimension skills were evaluated. This project was a routine work. The information and permission from the students were performed.

Data Collection and Analysis

The score of 8 dimensions skills were reported as the average calculated by Excel 2010. Dependent t-test was used for comparison of pre and post-test score. The level of significant (α) was 0.05.

RESULTS

The data from 21 Pharmacy Students (11 from year 2016, 10 from year 2017) who enroll Clinical Pharmacokinetics

course in topic "Therapeutic Drug Monitoring of Aminoglycosides" shown that improved of 8 dimension skills scores after learning with Kahoot web-based as follow (Mean \pm SD); Literacy (3.29 \pm 0.64 vs 4.19 \pm 0.40), Numeracy (3.24 \pm 0.83 vs 4.05 \pm 0.50), Reasoning (3.29 \pm 0.56 vs 4.19 \pm 0.40), Creative problem thinking (3.05 \pm 0.59 vs 4.19 \pm 0.60), Critical thinking (3.10 \pm 0.70 vs 4.10 \pm 0.62), Collaborative (3.19 \pm 0.75 vs 4.19 \pm 0.40), Communication (3.24 \pm 0.62 vs 4.24 \pm 0.44) and Computing (3.14 \pm 0.73 vs 4.00 \pm 0.62). In pool data of 2 generations and for generation year 2017, All dimensions had significant increase ($p < 0.05$). The results are demonstrated in Figure 1, Figure 2, Table 1 and Table 2, respectively.

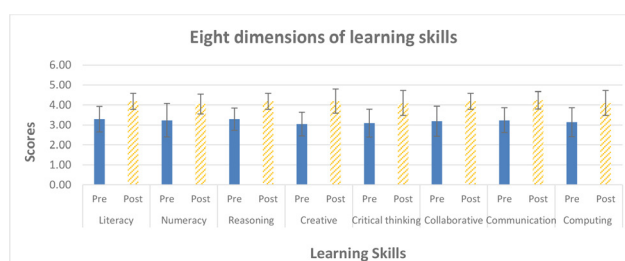


Figure 1: The comparison of eight dimensions of learning skill between pre-test and post-test questionnaires.

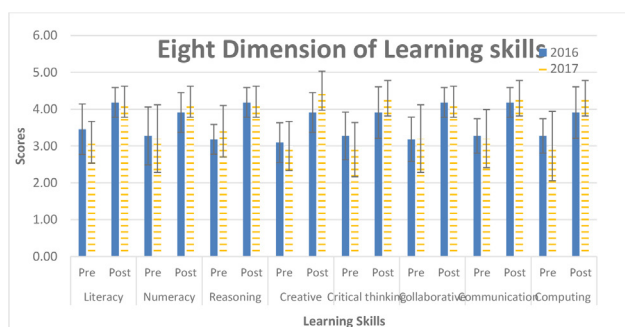


Figure 2: The comparison of eight dimensions of learning skill between pre-test and post-test questionnaire; the trends for 2 generations (2016 vs 2017).

Table 1: The eight dimension scores in 2 generations (2016, 2017).

Dimensions	Score 2016 (Mean+ SD) N=11			Score 2017 (Mean+ SD) N=10		
	Pre	post	p-value	Pre	post	p-value
Literacy	3.45 \pm 0.69	4.18 \pm 0.40	0.039*	3.10 \pm 0.57	4.20 \pm 0.42	0.00017*
Numeracy	3.27 \pm 0.79	3.91 \pm 0.54	0.066	3.20 \pm 0.92	4.20 \pm 0.42	0.0084*
Reasoning	3.18 \pm 0.40	4.18 \pm 0.40	0.0003*	3.40 \pm 0.70	4.20 \pm 0.42	0.0031*
Creative	3.09 \pm 0.54	3.91 \pm 0.54	0.0011*	3.45 \pm 0.69	4.50 \pm 0.53	0.00008*
Critical thinking	3.27 \pm 0.65	3.91 \pm 0.70	0.088	2.90 \pm 0.74	4.30 \pm 0.48	0.001*
Collaborative	3.18 \pm 0.60	4.18 \pm 0.40	0.001*	3.20 \pm 0.92	4.20 \pm 0.42	0.008*
Communication	3.27 \pm 0.47	4.18 \pm 0.40	0.0002*	3.20 \pm 0.79	4.30 \pm 0.48	0.001*
Computing	3.27 \pm 0.47	3.91 \pm 0.70	0.010*	3.00 \pm 0.94	4.30 \pm 0.48	0.001*

*P<0.05

Table 2: The eight dimension scores (Combination of 2 generations (2016+2017)).

Dimensions	Score 2016+ 2017(Mean+ SD) N=21		
	Pre	post	p-value
Literacy	3.45± 0.69	4.18± 0.40	0.000001*
Numeracy	3.45± 0.69	4.18± 0.40	0.0011*
Reasoning	3.45± 0.69	4.18± 0.40	0.000001*
Creative	3.45± 0.69	4.18± 0.40	0.0000005*
Critical thinking	3.45± 0.69	4.18± 0.40	0.0004*
Collaborative	3.45± 0.69	4.18± 0.40	0.00002*
Communication	3.45± 0.69	4.18± 0.40	0.0000005*
Computing	3.45± 0.69	4.18± 0.40	0.00006*

*P<0.05

DISCUSSION

From the results reveal that kahoot web-based leaning could improve learning skill significantly in Pharmacy Students. The several evidence also showed the same phenomenon. For example, in many fields such as physics, chemistry, engineering, computer sciences and medicine or pharmacy, the studies found that kahoot could create motivation of the students

This study, provided more information about effect of the 8 learning skills that similar to previous studies which evaluated only knowledge skill (literacy).¹⁻⁵ Study of Micaela Esteves *et al.* supported about the advantages of kahoot web based learning.⁶ Consider about the consistency effect of kahoot web-based leaning, the second generation was tested in this study (Year 2017), It found the similar effect as same as previous generation of students (Year 2016). According to the structure of kahoot web-based that encourage learning skills, therefore, it can applied for the subject that need to simplify the content as clinical pharmacokinetics course.

CONCLUSION

From the results, Kahoot web-based leaning could improve learning skills in Pharmacy Students. The effects consist in 2 generations. However, the confirmation study in the large group also needed.

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AUTHOR CONTRIBUTIONS

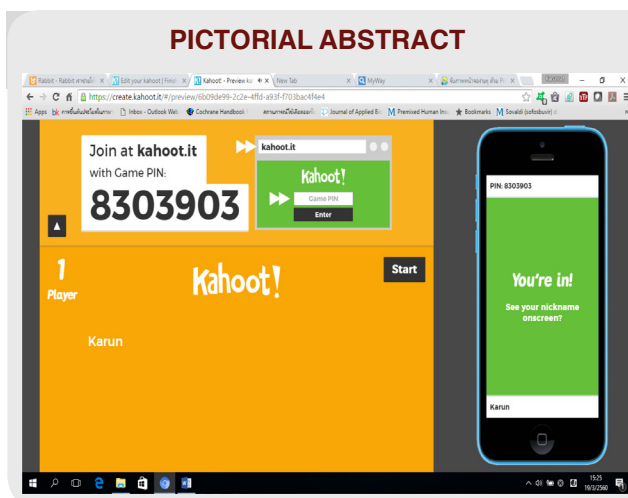
The author contribute to set the design activity, evaluation, interpretation and writing the manuscript for submission

CONFLICT OF INTEREST

The author declare no conflict of interest.

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SUMMARY

- The objectives of this study is to compare pre-and post -learning skill using Kahoot web-based learning and observe the trend of effect for 2 generations.
- From the pre-post-test of learning skill using Kahoot web-based learning in 21 Fifth years Pharmacy students (11 from year 2016, 10 from year 2017) who enroll Clinical Pharmacokinetics course in topic “Therapeutic Drug Monitoring of Aminoglycosides” shown that improved of 8 dimension skills scores (Literacy, Numeracy, Reasoning, Creative problem solving, Critical thinking, Collaborative, Communication and Computing) after learning with Kahoot web-based.
- It can be suggested that Kahoot web-based leaning could improve learning skills in Pharmacy Students. The effects consist in 2 generations. However, the confirmation study in the large group also needed.

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