

Content Validity Ratio (CVR) test

Jo, J., Jun, H., & Lim, H. (2018). A comparative study on gamification of the flipped classroom in engineering education to enhance the effects of learning. *Computer Applications in Engineering Education*, 26(5), 1626-1640.

41 Items

7 Dimensions

Learning attitude

I always study independently.

I always concentrate in class hours.

I prepare before class.

I actively participate in class activities like debate and practice in class hours.

I ask questions whenever I don't understand anything during class.

I review after class.

I am always interested in the content of any class regardless of the subject.

I enjoy class hours.

Attitude towards online lecture

I often study using online lectures.

I think online lectures are very helpful in studying.

The preparation (online learning) method is helpful in understanding concepts.

Online lectures are helpful for individual learning.

Online lectures are convenient because they are not restricted by time and place.

Online lectures are helpful for self-directed learning. Watching online lectures is not boring.

I participate well in online lectures.

Online lecture system and learning interest

I find online video lecture system interesting.

I find classes using online video lecture system fun.

My participation in class increased because of online video lecture system.

My immersion level in class increased with online video lecture system.

I became confident in learning through online video lecture system.

Availability of online lecture system

The online video lecture system makes it easier to access video lectures since it is more linked than using YouTube.

The online video lecture system is satisfactory since insufficient parts can be listened to again repeatedly.

The online video lecture system is more useful in grasping the degree of learning than when using YouTube.

The online video lecture system is useful in studying.

The vocabulary game of the online video lecture system is easy to play.

It is easy to check the ranking of the online video lecture system.

I think the online video lecture system is easy for anyone to use.

I found the online video lecture system easy to use.

The relationship between the vocabulary game in the online lecture system and learning attitude

I found the vocabulary game of the online video lecture system fun.

There is no burden on learning because the vocabulary game of the online video lecture system is enjoyable even when learners do not understand the learning concept.

I was able to focus on the video lecture more, because of the vocabulary game of the online video lecture system.

The ranking of the online video lecture system is interesting.

Learning participation increased due to the ranking system of the online video lecture system

The ranking system of the online video lecture system induced a competitive spirit.

I was able to focus more on the video because of the ranking system of the online video lecture system.

Relationship between the online lecture system and studying

The online video lecture system is helpful for learning.

I think the vocabulary game of the online video lecture system helps improve grades.

I gained confidence in my subjects by flip learning through the online video lecture system.

Satisfaction towards the online lecture system

I would like to have classes using the online video lecture system in other subjects as well.

I would like to recommend the online video lecture system to my friends.

I am generally satisfied with the online video lecture system.

5-point Likert scale (min: 1 point, max: 5 points)

Cronbachs α :

Learning attitude : .876

Attitude towards online lecture: .865

Online lecture system and learning interest: .924

Availability of online lecture system: .642

The relationship between the vocabulary game in the online lecture system and learning attitude: .767

Relationship between the online lecture system and studying: .531

Satisfaction towards the online lecture system: .877