

Detecting the Factors Affecting the Learning Performance of Students with Different Learning Styles in Flipped Learning

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INTRODUCTION

- Problem situation
- This study employed a rigorous procedure to validate the proposed factors of students with different learning styles affecting their learning performance in flipped learning.
- Literature shortly
- **Flipped learning.** The Academy of Active Learning Arts and Sciences (2019) developed an updated definition of Flipped Learning as a framework that enables educators to reach every student. The flipped approach inverts the traditional classroom model by introducing course concepts before class, allowing educators to use class time to guide each student through active, practical, innovative applications of the course principles
- **Online self-regulation.** Carver and Schier (2011) defined self-regulation as self-correcting adjustments, such as suppressing an urge arising from inside, or anxiety originating from the individual for staying connected in the process of achieving the learner's goal
- **Peer assessment.** Taylor (2019) explained that a learning style is the manner in which a learner interacts with and responds to the learning material or environment, and students may also use different learning strategies depending on the task.

RESULTS

- **Exploratory factor analysis results of students' attitudes toward online self-regulation and peer assessment.**
- The results suggested that these factors had highly acceptable reliability for assessing the students' attitudes toward online self-regulation and peer assessment.
- **Correlation analysis of students' attitudes toward online self-regulation and peer assessment with achievements.**
- the independent variable, "Time management" ($r = -0.311, p < 0.05$) had a moderate correlation to the dependent variable, the post-test. Meanwhile, "Help seeking" showed the highest correlation ($r = 0.781, p < 0.01$).
- "Positive Attitude" showed the highest correlation ($r = 0.781, p < 0.01$)

RESEARCH PROBLEMS

- Importance of the study
- Compared with previous studies, the major contributions and significance of this study is that it further highlighted a specific learning environment setting and provided an integral research perspective regarding college students' engagement in online self-regulation and peer assessment for learning performance that proposed a link between them in flipped learning.
- Problem Statements & Hypothesis
- Three specific research questions in this study were posed: (a) What indicators can be used to assess students' online self-regulation for flipped learning? (b) To what extent do students exhibit their peer assessment attitudes toward flipped learning? and (c) What are the implications of this study for flipped learning research?

RESULTS

- **Effective factors of students' attitudes toward online self-regulation in the flipped learning.**
- The active-style students showed better attitudes than the reflective-style students did in "Task strategies" (mean = 3.81, $SD = 0.56$ vs. mean = 3.47, $SD = 0.49$), "Time management" (mean = 4.07, $SD = 0.52$ vs. mean = 3.67, $SD = 0.51$), and "Help seeking" (mean = 4.17, $SD = 0.45$ vs. mean = 3.74, $SD = 0.50$).
- The sequential-style students showed better attitudes than the global-style students did in "Environment structuring" (mean = 4.32, $SD = 0.44$ vs. mean = 4.00, $SD = 0.52$).

METHOD

- Method
- Sample / Study Group
- The participants in the study were pre-service teachers in China, with a total of 42 students majoring in science.
- Based on the ILSQ, as proposed by Solomon and Felder (2005), 18 students were assigned to the active-style group, and the other 24 were assigned to the reflective-style group. In addition, 26 students were assigned to the sequential-style group, and the other 16 were assigned to the global-style group.
- Data collection tool
- Two pre-validated scales including the scale of online self-regulation and the scale of peer assessment were completed and the reliabilities were calculated.
- The Felder-Soloman Index of Learning Style Questionnaire was used to identify students' learning styles.
- Data analysis
- The data were analyzed using exploratory factor analysis, correlation analysis, and t test.

RESULTS

- **Effective factors of students' attitudes toward peer assessment in the flipped learning.**
- The active-style students showed better attitudes than the reflective-style students did for "Positive Attitude" (mean = 4.353, $SD = 0.55$ vs. mean = 3.86, $SD = 0.45$), "Online Attitude" (mean = 3.99, $SD = 0.67$ vs. mean = 3.55, $SD = 0.40$), and "Understanding-and-Action" (mean = 4.33, $SD = 0.52$ vs. mean = 3.99, $SD = 0.38$).
- The sequential-style students showed better attitudes than the global-style students did for "Online Attitude" (mean = 3.91, $SD = 0.62$ vs. mean = 3.48, $SD = 0.34$).

RESULTS

- **Effect of prior knowledge and flipped learning upon learning-style classification.**
- The pre-test results revealed that these two groups had similar levels of prior knowledge before proceeding with the experiment.
- The post-test results revealed that these two groups had similar levels of performance after proceeding with the experiment.
- **t-test analysis of students' achievements in flipped learning.**
- The t -test result of these achievements showed that a significant difference was found between the scores of the pre- and post-test with $t = -2.262$ ($p = 0.029 < 0.05$, $d = -0.46$), showing that the flipped learning promoted the students' achievements.
- The t -test result revealed that the score of the students' post-test was significantly higher than that of their pre-test, which means the effect of the flipped learning upon their achievement worked significantly.

CONCLUSIONS AND SUGGESTIONS

- Conclusions
- Students with different learning styles had different needs in their online self-regulation.
- Participating students held positive attitudes toward the use of peer assessment.
- Suggestions
- The study proposes a concept change in learners' student engagement mechanism for flipped learning to promote students' learning performance and teachers' teaching approaches.
- It provides teachers and researchers with a good reference for implementing effective flipped classrooms as well as a new direction for flipped learning studies with effective strategies.