A study of the validity and reliability of the online homework emotion regulation scale

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ABSTRACT

Online education grows at a level far beyond that of overall higher education; millions of students are taking online courses. Online assignments often elicit unpleasant emotional responses (e.g., frustration). However, the issue of regulating students' emotion to complete online homework has been notably missing from much online learning literature. The aim of our investigation is to validate the Online Homework Emotion Regulation Scale (OHERS), based on data from 612 undergraduates. The sample was randomly split into two groups, where each group was used for exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), respectively. Both EFA and CFA findings indicated that the OHERS consisted of two subscales: Emotion Management and Cognitive Reappraisal. In addition, the OHERS and its subscales showed very good to excellent reliability. Regarding the validity evidence of the OHERS, emotion management and cognitive reappraisal were positively associated with online homework purposes, behaviors, learning strategies, and e-learning satisfaction, consistent with theoretical expectations.

1. Introduction

Over the last decade, online education continues to grow at a rate (16.1%) far beyond that of overall higher education (2.5%); the amount of higher education students who attended a least one online class soared to a total of 7.1 million in US (i.e., 33.5% of the total students; Allen and Seaman [2]). With the fast development of online education [2,38], increasingly more college students take online courses and receive online assignments [1,23,28].

Some emerging findings indicate that online assignments tend to elicit unpleasant emotional responses (e.g., anxiety and frustration; Hove and Corcoran [24], Khanlarian and Singh [28], Zembylas [59]). These findings are not surprising for two reasons. First, emotional issues are hardly absent in online learning environments [35,58,59], as uncertainty and frustration frequently result from social isolation and technological issues associated with taking online courses Smith [47,58]. Second, conventional, face-to-face homework assignments has long been viewed as an emotional charged activity for many school-aged children across countries [30,57].

What is surprising is that the issue of regulating or controlling students' emotion to complete online assignments has been notably missing from much online learning literature. This is surprising, particularly as research showing that emotion regulation powerfully influences engagement and learning outcomes in face-to-face environments [19,41] and online environments [28,59]. Consequently, it would be highly desirable to examine the issue of emotion regulation in online homework. This is precisely the issue that is now taken up in our present study.

2. Theoretical framework

One framework concerning emotion regulation is Gross' model [15], in which emotion regulation is viewed as "the process by which individuals influence emotion they have, when they have them, and how they experience and express these emotions" (p. 275). In this framework, Gross [16] has paid special attention to the importance of cognitive change in regulating and monitoring one's emotional states: "The personal meaning that is assigned to the situation is crucial because it powerfully influences which experiential, behavioral, and physiological response tendencies will be generated in that particular situation" (p. 283).

Regarding cognitive change, emotion regulation literature over the years has been largely limited to one form of cognitive change – cognitive reappraisal [18], which "involves changing a situation's meaning

in a way that alters its emotional impact" [17, p. 14]. What this line of literature has shown is that cognitive reappraisal plays an important role in decreasing negative emotions [17,27]. Compared with unstructed watch conditions, cognitive reappraisal of negative images, for example, resulted in smaller increases in blood pressure as well as reduced negative affect [26]. Similarly, cognitive reappraisal was found to improve academic outcomes on stressful cognitive tasks when individuals reinterpret their experience or the meaning of the situation, by reducing or qualitatively changing the level of stress (e.g., from threat to challenge; Schmader et al. [46]).

It is interesting, however, that hardly any attention has been devoted to another possible form of cognitive change (i.e., emotion management), particularly given that cognitive change is broadly referred to as "changing how we appraise the situation we are into alter its emotional significance, either by changing how we think about the situation or about our capacity to manage the demands it poses" [17, p. 14]. Thus, it would be important to investigate another form of cognitive change that involves changing how individuals think about their capacity to manage emotion impact (i.e., emotion management), in addition to the current emphasis on how individuals reframe about a situation's meaning (i.e., cognitive reappraisal). Consequently, it would be important to examine whether cognitive reappraisal can be empirically distinguished from emotion management in online learning environments. This line of study is particularly important, because cognitive reappraisal as one of cognitive change has been found to have a desirable influence on regulating unpleasant emotion experiences (e.g., Gross and Thompson [17], Schmader et al. [46]).

3. Literature pertaining to online homework emotion

Across countries, secondary school students continue to report unpleasant emotional experience while doing (face-to-face) homework (e.g., frustration and stress; Dettmers et al. [9], Verma et al. [57], Xu and Corno [57]). Emerging findings from several studies tapping into online assignments suggest that this trend continues with undergraduates' online assignments [24,28,59]. Almost everyone in the study by Zembylas [59] talked about their fear, anxiety, stress, and frustration associated with online assignments. These included: (a) the unfamiliar mode of online learning and limited experience with using technology to complete online homework, (b) the absence of face-to-face interaction with online professors, and (c) the Internet, the library, and the amount of time demanded by studying online, with online assignments in particular. For example, one student stated:

I have no idea how this library system works. I spent a lot of time in front of the computer, I went to the university and talked to the library assistant, yet I still feel clueless…. This makes me tremendously anxious and frustrated. (p. 79)

Another student shared her anxiety for "all the time that it takes to find Internet resources for the assignment, only to realize at the end of the day that most of them are irrelevant" (p. 80).

In another related study, Khanlarian and Singh [28] found that students' frustration with online homework was prevalent (e.g., anxious, helpless, and frustrating). Using structural equation modeling, their study further revealed that this frustration was negatively related to academic performance (assessed by homework grades and test grades). In addition, two separate structural equation models (for face-to-face and online students respectively) revealed that the linkage (i.e., between homework frustration and academic performance) was stronger for online students ($\beta = -0.27, p < .01$) than for face-to-face students ($\beta = -0.11, p < .01$).

Regarding the issue of emotion regulation in homework, Xu [54] investigated empirical models of homework emotion management, based on 1895 secondary school students from 111 classes. Although the findings (regarding a broad spectrum of variables that were related to emotion management in homework) were interesting and extended

the existing homework research, Xu's [54] study was limited to one form of homework emotion regulation (i.e., homework emotion management, which involves down-regulating unpleasant emotion and up-regulating positive emotion). Consequently, Xu [54] called for incorporating "additional items relating to other strategies that students may use to regulate their emotions - such as cognitive reappraisal" in future homework studies (p. 552). This call is particularly relevant in the case of online assignments, as emerging findings pertaining to online assignments suggest that students continue to report unpleasant emotional experience while doing online assignments well into college years [24,28,59], and as hardly any studies that have been conducted to tap into the issue of regulating homework emotion in online environments.

4. The present study

The goal of the current study is to validate the Online Homework Emotion Regulation Scale (OHERS) for undergraduates regarding their online assignments. In particular, it has three purposes: (a) to test the factor structure of the OHERS through EFA and CFA, (b) to assess its internal consistency, and (c) to evaluate its validity evidence by investigating the linkages between the OHERS and a range of theoretically relevant measures, including online homework purposes, online homework behaviors, learning strategies, student e-learning satisfaction, and academic achievement.

As the significance individuals attach to a task is vital for their effort and persistence directed toward to the task [12], students' attitudes toward homework exert a powerful influence on how they approach homework assignments [51]. Thus, we hypothesized that the OHERS would be positively related to online homework purposes. In addition, we hypothesized that the OHERS would be positively related to online homework effort and completion, consistent with theoretical expectation concerning the role of emotion regulation on task completion [17,41]. Because there were low to moderate positive relationships between self-regulation (e.g., meta-cognitive self-regulation and debugging strategies) and learning strategies in previous research [37], we hypothesized that the relationships between the OHERS and learning strategies would be comparable (i.e., low to moderate positive).

Meanwhile, as students with higher negative emotions are less satisfied with their learning (e.g., to avoid continuing adoption of e-learning; Fan et al. [13]), and as self-regulated learning (e.g., meta-cognitive self-regulation) was positive and significantly related to student satisfaction in online courses [31], we hypothesized that students' emotion regulation in online assignments would be positively related to e-learning satisfaction. Finally, as previous research indicates that emotion regulation positively influences academic achievement [17,41], we hypothesized that the OHERS would be positively related to the final course grade.

5. Method

5.1. Participants and procedure

Participants consisted of 612 undergraduates from one university in southeastern China. Among them, nearly three quarters (74.5%) were female. The age breakdown was *24 years or less* (42.6%), *25–29 years* (45.3%), and *30 years or over* (12.1%). Nearly half of participants were junior (44.3%), while the rest of them were almost equally distributed among freshmen, sophomore, and senior (ranging from 18.1% to 19.3%). Overall, 32.5% were full-time students.

The number of online courses participants took previously were 0 (33.8%), 1 (14.9%), 2 (11.3%), 3 (8.8%), 4 (5.2%), and 5 or more (26.0%). Similar to the undergraduates in the study by Sun, Tsai, Finger, Chen, and Yeh [48], two-thirds participants (66.8%) rated themselves as having "intermediate" level computer skills, whereas