



Effects of goal orientation on online learning: A meta-analysis of differences in Korea and US

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Abstract

This meta-analysis examines the correlation between goal orientation and related variables in online learning to examine the influence of individual goal orientation on online learning as well as the differences arising from diverse cultural backgrounds. The study analyzed 27 papers from 2000 to 2022, comprising 8 US and 19 Korean studies. The average effect size of goal orientation and related variables, such as learning satisfaction, self-efficacy, and task value, were also analyzed. In addition, moderating effect according to the country and type of goal orientation was examined to evaluate differences arising from cultures. It was found that learning immersion, learning participation, and intention to continue learning, showed a high average effect size with goal orientation, with the other related variables also demonstrating a significant average effect size. There was no moderating effect of the state in the relationship between goal orientation and academic achievement, although a moderating effect existed according to the type of goal orientation. Based on the results of this study, we analyzed the variables that can reinforce learning along with goal orientation in online learning situations. Therefore, our findings will help formulate various educational support directions that can lead students to successfully gain knowledge through online learning, which has been growing expeditiously in the wake of the COVID-19 pandemic.

Keywords Online learning · Goal orientation · Country comparison · Academic achievement · Meta-analysis · Educational support

Introduction

The COVID-19 outbreak has driven changes across various sectors, including politics, economics, culture, and education, with novel methods without face-to-face interaction gaining popularity (Lee & Shin, 2020). Accordingly, many changes have been made in the educational field as well. The Korean Ministry of Education postponed the commencement of schools four times due to COVID-19, and finally decided to introduce online classes for approximately two years. At the university level, lectures were conducted using a hybrid method that included both online and offline classes

over the last two years. Considering the sudden transition to online classes due to the pandemic, and the absence of prior experience, the effectiveness of online classes could not be successfully verified. Teachers in elementary and secondary schools did not have enough time to equip themselves with information and communication technology to conduct online classes effectively, while students faced some difficulties in adapting to this new classroom environment (Lee & Kim, 2020).

Although online education developed expeditiously in the wake of COVID-19, it was already being frequently used to obtain a degree or complete the curriculum at the university level. However, despite the advantages of online learning such as convenience of time and place, and methods, previous studies reported limitations on learning outcomes (Jang & Choi, 2017; Kim & Kim, 2023). Online learning is generally leads to low academic achievement. Especially since classes are conducted in an environment where teachers and students are physically separated, students find it difficult to concentrate when there is a large direct, indirect, or psychological influence from outside (Anthonysamy et al., 2020;

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Chang et al., 2019). Banoor et al. (2018) found positive effects for students' achievement but Bird et al. (2022) found there were negative effects for students in online learning.

Therefore, in order to ensure successful knowledge acquisition in online learning, self-directed learning ability to actively participate in self-learning and maintain it efficiently has been emphasized (Kim, 2020). However, one of the many variables that influence students' self-directed learning is their goal orientation, which is defined as the performance that learners want to achieve by participating in learning activities or the purpose of participating in learning activities, which has an important effect on self-directed learning (Carter Jr et al., 2020; Durnali, 2020; Sun et al., 2022). In a traditional classroom setup, previous studies have found that a learner's goal orientation is a factor that directly or indirectly affects the success of self-directed learning. However, since these studies were conducted in a traditional classroom setting with teachers, rather than online learning, research on whether goal orientation affects various variables, including self-directed learning in online learning, should be investigated separately. An analysis of previous studies on goal orientation in the online context showed that it had a positive correlation with learning satisfaction. It has been shown that there is a negative relationship (Tuominen et al., 2020; Song & Jung, 2013).

In addition to personal variables such as self-efficacy, learners' goal orientation is also significantly influenced by environmental variables such as classroom goal structure and relationships (Fujita et al., 2006; Lazarides & Rubach, 2017; Lerang et al., 2019). For example, if families have a strong tendency to check their learning status through comparison, or in a classroom led by a teacher who conducts learning with the goal of mastery, individual goal orientation gets affected. Microscopically, these differences can be noticed in the classroom or home environment, and macroscopically, they can be recognized through cultural differences. South Korea, which shall hereinafter be referred to as Korea, pursues collectivism, and it is a culture embodying strong comparison with strong admissions policies (Yang, 2019). Conversely, the United States pursues individualism and focuses on individual mastery rather than learning by comparison (Cho, 2003). Therefore, this study aims to investigate how macroscopic variables such as culture affect individual goal orientation in online learning by analyzing how these dramatic cultural differences affect individuals.

This study is important in examining the effect size of the correlation between variables related to goal orientation in a situation where online learning is continuing to expand, as well as factors according to the national moderator variables between the United States and Korea, with diverse cultural backgrounds. Meta-analysis is meaningful as it compiles research achievements by synthesizing and analyzing studies, deriving their significance and implications,

and promoting the use of accumulated achievements in the research field efficiently (Cho & Jeong, 2015).

Therefore, the purpose of this study was to explore the relationship between variables mentioned in previous studies as a success factor for goal orientation and online learning to reinforce the positive impact of online education. Previous studies showed online education was effective some students or not. Accordingly, this study analyzed task value, learning commitment, self-regulation strategy, learning participation intention, and academic achievement, which are mainly studied as variables related to online learning achievement. Prior research reported that task value has a positive effect on learning performance in online learning situations, because it involves selecting learning if one is interested in the task or is content and perceives that the content to be learned is useful (Bong, 2001; Joo et al., 2008). These results of this study will be useful to develop the guideline of online education.

Therefore, the research questions that were set to achieve this purpose are as follows:

1. What is the average effect size of online learning with goal orientation and related variables such as learning satisfaction, self-efficacy, task value, learning immersion, self-regulation strategy, learning participation and continuing intention, and academic achievement?
2. Does the average effect size of academic achievement and goal orientation in online learning differ between the US and Korea?

Literature review

Goal orientation in online learning

Although online learning has various advantages such as securing a free learning space and time, it can be pursued only when the learner has a high learning goal or task value, and through this, academic achievement can ultimately be expected (Peck et al., 2018). Variables influencing online learning include goal orientation, task value, and self-regulated learning ability, which lead to differences in learning outcomes such as academic achievement (Yeh et al., 2019). In particular, goal orientation is studied as an important variable in online learning, where the maintenance of learning is regarded as a variable that affects the form in which learners commence and maintain their participation in learning (Kim, 2021). Regarding goal orientation in online learning, it was found that learners with mastery goal orientation actively participate in learning and continuously strive to develop their own learning abilities, positively affecting academic achievement (Lee, 2019a). Specifically, in online learning, posts and discussions on online bulletin boards, which

learners use as a means of communication, were remarkably high in the case of mastery goal orientation learners (Noh, 2011). Simultaneously, it was found that the higher mastery goal orientation in online learning, the greater the learning satisfaction through active participation in learning (Bae, 2020).

In online learning, learners with mastery goal orientation not only exhibited higher learning participation but also greater self-regulated learning strategies; therefore, it can be expected that there will be differences in learning participation and learning methods according to goal orientation in online learning (Kim, 2021). Essentially, learners with a higher mastery goal orientation exhibited a significantly greater intention to continue learning, which confirmed to have an impact on academic achievement (Jang, 2021; Lee, 2019a, 2021).

Relationship between goal orientation and academic achievement in online learning

Goal orientation has been identified as a variable with a significant effect on academic achievement in several previous studies (Hyun & Shin, 2020; Ko & Min, 2021; Kim, 2021). In particular, learners with higher mastery goal orientation were found to have enhanced their academic achievement through self-regulated learning, and be significantly different from learners with a greater performance goal orientation (Hyun & Shin, 2020; Ko & Min, 2021). The subjects of this previous study were diverse, from middle school to college students, and the overall relationship between goal orientation and academic achievement was examined by setting various control variables that affect academic achievement, such as self-regulated learning strategies and learning motivation.

Therefore, it can be inferred from previous studies that academic achievement is significantly affected by goal orientation, which makes it necessary to confirm how this relationship occurs in online learning as well. An analysis of the effect of goal orientation and interaction on academic achievement in cooperative learning conducted in online learning found that goal orientation significantly predicted academic achievement, confirming it to be a very important variable in online learning (Kim, 2021). Among distance college learners where learning takes place online, learners with lower academic achievement exhibited different goal orientation than their counterparts with higher academic achievement. Furthermore, observations of college students participating in online learning also revealed a significant correlation between goal orientation and academic achievement (Bae, 2020). However, it should be noted that certain studies have reported no significant correlation between goal orientation and academic achievement (Lee, 2019a). Therefore, it is necessary to ascertain the type of influence and relationship accompanying goal orientation, a variable

that has an important influence on academic achievement, in online learning by analyzing the relationship between various objects and variables. In addition, it is crucial to integrate and examine the mixed results of goal orientation, for instance, in the cases of the two-dimensional study that categorized goal orientation into performance goal orientation and mastery goal orientation, and another that categorized it into several dimensions by adding the concepts of avoidance and approach.

The understanding of the relationship between these variables can be further expanded by studying the moderating and mediating variables in the relationship between goal orientation and academic achievement in online learning. Previous studies found mastery goal orientation is one of moderating variables in the relationship between goal orientation and academic achievement in online learning.

Analyzing the effect of goal orientation on academic achievement through learning strategies demonstrated that mastery goal orientation positively predicted academic achievement through deep learning strategies (Dupeyrat & Mariné, 2005).

In addition, analyzing the effect of goal orientation and method of providing feedback to a class on learning participation found no statistically significant difference, although it was found that learners with higher mastery goal orientation participated actively in learning (Kim & Park, 2014).

As a variable that plays a mediating role in goal orientation and academic achievement, the leadership of the instructor, who plays a vital role in learning immersion and moderating, has been studied (Park & Sim, 2020). As already mentioned, goal orientation, which is reported to have a strong influence on learners' academic achievement, is significantly influenced by the surrounding environment, such as the classroom goal structure and relationship with the surroundings (Fujita et al., 2006). It has been reported that a learner's academic achievement is affected by the goal structure of the group they are part of, and that there is a difference in individual learning and self-regulation according to the degree to which the group's goal structure and the individual's goal orientation coincide (Beik & Shin, 2021). It has also been reported that the form and method of learning, such as self-directed or cooperative learning, depend on the causal relationship, which ultimately affects academic achievement (Cornelius-White, 2007; Kim, 2021).

These observations indicate that the academic achievement of learners can be affected by the relationship with the surroundings as well as the classroom goal structure surrounding the individual. These goal structures differ depending on the culture of each country. Representatively, Korea pursues collectivism, while the US follows individualism (Yang, 2019). Korea, which pursues collectivism, is heavily influenced by other people's evaluations and have a strong orientation toward focusing on others.

On the other hand, it was found that the US, which pursues individualism, is more likely to be interested in one's own learning itself rather than comparisons with others (Cho, 2003). Therefore, it can be expected that Korea and the US, where there are cultural differences in the goal orientation in the overall learning structure as well as in specific learning situations, will manifest differently in online learning as well.

This study predicted that the difference between Korea and the US, which is generally seen in goal structure and relationship, will also affect online learning and drive such differences. In view of the above, the purpose of this study is to verify this by comparing the relationship between learners' goal orientation and academic achievement in online learning in Korea and the US.

Methodology

Search process

This study analyzes the correlation between goal orientation and related variables in online learning, targeting adult learners. Various research databases were used to collect Korean and US studies, and the study period was set from 2000 to 2022. First, research on Korea utilized Research Information Sharing Service and Google Scholar operated by the Korea Education and Research Information Service, and searched by combining keywords such as “online,” “e-learning,” “non-face-to-face,” “remote,” “cyber,” “goal orientation,” and “comparison orientation.”

Next, for the US studies, Google scholar, ProQuest Digital Dissertation databases, and EBSCO host Information Services were used and searched by combining keywords such as “online learning,” “e-learning,” “untact,” “remote,” “cyber,” “social comparison,” and “goal orientation.” Approximately 667 Korean studies and 1,044 American studies were searched, and duplicate studies and cases that were not pedagogical or psychological were excluded. In addition, cases where the double correlation coefficient was not reported or the study subjects were not Korean or American learners were excluded. Finally, adult learners were selected as a collective target, who use online learning as their main learning method rather than as a learning aid. Therefore, studies on adolescents such as middle and high school students were excluded.

In addition, definitions of the keywords and measurement tools set in each study were checked, and additional studies were collected through references. Overall, 27 were selected, including 19 Korean and 8 US studies.

Coding process

The two authors discussed the purpose of this meta-analysis and specific coding method, and reached a consensus while coding. After coding individually, reliability was secured through cross-checking.

The variables and criteria coded in this study are as follows. Basic information were coded, such as the publication year of the paper, nationality of the study, name of the paper, and information related to the study object such as age, sex, nationality, and number of cases. In addition, the measurement tools were coded, such as the types and methods of inspection tools, related factors, definitions of factors, and correlation coefficients. Overall, 38 variables were collected and investigated in this study. However, since integrating the variables reported in at least three papers helps to secure the validity of any meta-analysis, variables reported in less than two papers were excluded (Seo, 2017). In this process, the two authors repeatedly discussed categorization based on the main keywords and purpose of this study. Variables were classified into learning satisfaction, self-efficacy, task value, learning commitment, self-regulation strategy, learning participation and continuing intention, and academic achievement (Tables 1, 2).

Data analysis

R (version 4. 2.0.) was used for meta-analysis. Meta and metafor packages were used, and data were coded into

Table 1 Coding variables

Study Component	Code	Details
Basic Information	Title	
	Names of researchers	
	Publication year	
	Nationality of the study	
Participant	Mean age	
	Grade levels	
	Number of participants	Total number of participants, Number of females, Number of males
Measurement	nationality	
	Title of measurement methods	
	Type of measurement	Standardized measurement and Researcher-developed measurement
	Related factors	
	Definitions of factors	
	Correlation coefficients	

Table 2 List of studies used for analysis

First Author	Year	Nation	N	<i>r</i>
Ibrahim S. Al-Harthy	2013	US	125	0.45(SE), 0.23(AA)
Sang-Joon, Bae	2020	Korea	241	0.48(AA)
Won-Young, Chang	2021	Korea	216	0.26~0.52(SE), 0.39(IL), 0.14~0.16(AA)
Moon-Heum, Cho	2013	US	64	0.30~0.34(SE), 0.68(SR)
Jin-Ho, Choi	2021	Korea	171	0.35(LS), 0.38(IL)
Karen Clayton	2010	US	132	0.41(SE), 0.54(SR)
KENT J. CRIPPEN	2009	US	176	0.21~0.28(AA)
Min Kyung, Han	2009	Korea	177	0.40~0.62(SE), 0.27~0.56(TV), 0.36~0.57(SR)
Jin, Jang	2021	Korea	335	0.55~0.93(IL), 0.51(PI)
Myunghee, Kang	2010	Korea	71	0.24(AA)
Min-Ji, Ko	2014	Korea	256	0.24(LS), 0.41(IL), 0.43(AA)
Tae-Yeon, Kim	2021	Korea	217	0.82(IL), 0.87(PI)
Su-Jin, Ku	2011	Korea	130	0.19(LS), 0.23~0.51(TV), 0.19~0.29(AA)
Soungyoun, Kwon	2008	Korea	138	0.42~0.50(SE), 0.27~0.69(TV), 0.35~0.58(SR)
Kwang-Min, Lee	2021	Korea	338	0.16(SR), 0.64(PI)
Kyung Sun, Lee	2008	Korea	195	0.15~0.52(LS), 0.20~0.50(SE), 0.20~0.55(PI), 0.20~0.58(AA)
Soohyun, Lee	2007	Korea	56	0.35(IL)
Yeong, Lee	2011	Korea	684	0.39(LS), 0.28(SE), 0.49(SR), 0.40(PI), 0.43(AA)
Yun-Hee, Lee	2003	Korea	57	0.35(SR), 0.29(AA)
Richard Lynch	2004	US	94	0.47(SE)
Yang-Jin, Noh	2011	Korea	59	0.40(IL), 0.34~0.37(PI)
Hyojin, Park	2010	Korea	71	0.22(AA)
Larry Peck	2018	US	347	0.24~0.44(SE), 0.24~0.63(TV)
Yan Yang	2013	US	150	0.19~0.37(SE), 0.50(TV)
Yu-Chen Yeh	2019	US	93	0.48(SR)

LS: Learning Satisfaction, SE: Self-efficacy, TV: Task value, IL: Immersion in learning, SR: Self-regulation strategy, PI: Participation in learning and intention to continue, AA: Academic achievement

text (.txt) and Microsoft Excel (.xlsx) files for analysis. This study used both the correlation coefficient *r* and the converted value of *Fisher's z* for meta-analysis, because *Fisher's z* value follows a more normal distribution than *r* (Hwang, 2015). Before analyzing the overall effect size for the correlation coefficient, homogeneity was verified to evaluate whether the data to be analyzed in this study could be integrated.

To verify homogeneity, both the *Q* value and *I*² were used as statistical indices indicating heterogeneity, which refers to the degree to which the effect size shown from each study is widely distributed. Heterogeneity (*I*²) of 75% or more refers to a large size of heterogeneity (Hwang, 2015). Meta-analysis is also prone to errors. This is because most of the papers with efficient data collection generally have statistically significant results, and they are more likely to be published than studies that do not (Gurevitch et al., 2018). Therefore, the study included in a meta-analysis should identify the possibility of a distorted distribution or overestimation. For this purpose, Egger's regression test, which is one of the representative methods

for statistically verifying publication bias (or publication error), was used.

Results

Average effect size of variables related to goal orientation

Variables related to goal orientation, learning satisfaction, self-efficacy, task value, learning immersion, self-regulation strategy, learning participation and intention to continue, and academic achievement were selected. It was found that the average effect size of goal orientation and learning satisfaction was 0.32, and that of goal orientation and self-efficacy was 0.38, which was intermediate. Next, the average effect size of goal orientation and task value was 0.45, and that of goal orientation and learning commitment was 0.60, which was relatively high.

The average effect size of goal orientation and self-regulation strategy was 0.46, and that of goal orientation and

learning participation and persistence was 0.53. Finally, goal orientation and academic achievement were 0.31, being at the middle level (Cohen, 1988). When reviewed comprehensively, goal orientation revealed learning commitment, learning participation and continuity, and higher mean effect size.

In addition, the heterogeneity coefficient (I^2) exhibited higher heterogeneity, above 75%. Meanwhile, publication bias was verified to confirm the existence of data errors in this result. Here, excluding variables with $k = 10$ or less, self-efficacy, self-regulation strategies, and academic achievement of more than $k = 10$ were analyzed. Table 3 demonstrates each result. The test demonstrated that self-efficacy had no publication bias ($t = 1.18, df = 17, p = 0.25$), self-regulation strategies ($t = 0.58, df = 8, p = 0.58$), and academic achievement ($t = -1.82, df = 13, p = 0.09$) were also verified to have no publication bias.

Analysis of moderating effect according to differences in country and goal orientation

In order to examine the differences in the effect of different goal structures on learning according to culture, the countries were categorized into Korea and the United States and selected as control variables, and the average effect size in the relationship between goal orientation and academic achievement was analyzed. It was found that there was no statistically significant difference between countries, confirming that the effect of differences in goal structure according to culture on learning is insignificant ($Q = 1.56, df = 1, p = 0.21$).

Meanwhile, in order to examine the difference between individual goal orientation and learning within the same culture, goal orientation was classified into performance goal orientation and mastery goal orientation and selected as a moderating variable. A significant statistical difference was confirmed according to goal orientation ($Q = 5.23, df = 1, p = 0.02$), with performance goal orientation having an average effect size of 0.21 and mastery goal orientation of 0.34. This can be interpreted as having a relatively distinct influence. Table 4 shows each result.

Discussion

This study examined the effect size through a correlation meta-analysis of the factors that affect students' goal orientation in online learning situations to determine the variables that have the most influence on goal orientation. It attempted to ascertain the support needed for effective learning of students after COVID-19, which is common in the prevailing online learning situation. In addition, goal orientation in these online situations was classified into the United States and Korea to examine whether there was a difference between cultures, and whether the relationship between academic achievement and goal orientation resulted in a difference in the moderating effect according to mastery and performance goal orientation.

First, related variables with goal orientation, learning commitment, learning participation, and intention to continue learning were found to have medium effect sizes of 0.60 and 0.53, unlike other variables, and learning

Table 3 Average effect size of variables related to goal orientation

Variables	<i>k</i>	<i>Fisher z</i>	95% confidence interval	<i>Q</i>	<i>df</i>	I^2	<i>Egger p</i>
Learning Satisfaction	6	0.32	0.20–0.42	26.02**	5	80.8%	
Self-efficacy	19	0.38	0.32–0.44	74.05**	18	75.7%	0.25
Task value	9	0.45	0.32–0.56	86.69**	8	90.8%	
Immersion in learning	8	0.60	0.34–0.77	393.19**	7	98.2%	
Self-regulation strategy	10	0.46	0.36–0.55	59.36**	9	84.8%	0.58
Participation in learning and intention to continue	8	0.53	0.33–0.68	181.07**	7	96.1%	
Academic achievement	15	0.31	0.23–0.38	68.89**	14	79.7%	0.09

Table 4 Analysis of moderating effects according to differences in country and goal orientation

Variables	Moderator	<i>k</i>	<i>Fisher z</i>	95% confidence interval	<i>Q</i>	<i>df</i>	<i>p</i>
Achievement	Korea	12	0.32	0.23–0.41	1.56	1	0.21
	US	3	0.24	0.15–0.32			
Achievement	Performance orientation	4	0.21	0.13–0.28	5.23	1	0.02
	Mastery orientation	11	0.34	0.25–0.43			

satisfaction, self-efficacy, and academic achievement had an effect size of 0.31 or above. The results of this study are consistent with previous studies on the relationship between learning commitment and goal orientation (Jeong & Seol, 2019). Learning immersion is observed when the learner fully participates in the activity and experiences pleasure and creativity. It is a sense of self-satisfaction (Kim, 2006). Therefore, learning commitment is a variable related to goal orientation. According to a study by Chen and Wong (2015), students with mastery goal orientation showed a higher correlation than performance goal orientation. In the case of online discussion learning, academic achievement varies according to learning participation (Kim et al., 2020). Since such a learner's participation in learning is affected by learning motivation, their participation and academic achievement in online learning increases when situational factors that promote goal orientation are appropriately given in the online discussion situation. It can even affect performance. Sim and Song (2014), who presented the research result that learners with clear goal orientation show high learning participation in online discussion learning, also agreed with the results of this study. Recently, classes using online or mobile-based platforms have gained popularity. Classes using various media consider various learners and utilize the relationship between goal orientation and variables such as learning immersion and academic continuity that affect academic achievement according to the type of goal orientation. It may be necessary to develop a suitable support strategy. This study on the relationship between goal orientation and academic achievement confirms that a learner's goal orientation affects academic achievement in online learning as well as in face-to-face classes. Therefore, it can be seen that goal orientation is a very important variable for an individual's learning regardless of the learning situation, such as the platform being online or offline. However, by comparing the effect size of goal orientation online and offline, it is possible to ascertain the differences in the influence of internal variables such as goal orientation on the learning situation. Accordingly, it is possible to confirm the difference in the influence of individual variables according to the change of the learning environment in the current situation, wherein online learning is gradually gaining momentum.

Second, the difference in the effect size of the correlation between goal orientation and academic achievement according to culture was not significant. This shows that the difference in the effect size of the correlation between goal orientation and academic achievement in online learning situations between the countries is not significant. This is different from the results of research by Bong (2008) and Gutman (2006) on the influence of parents on their children's goal orientation. Bong stated that parent–child relationship had a positive effect on a child's mastery goal orientation. Gutman conducted an open-ended interview

with African American parents and found that children of parents with higher mastery goal orientation make significant progress than children of parents with lower mastery goal orientation. This result is different from there being no difference in the correlation coefficient between students' academic achievement and goal orientation according to the national social goal structure of this study. Additionally, Wang et al. (2019) reported that Asians, who are known to have a collectivist culture, show performance goal orientation in comparison to others for their tendency to interpret people's behavior in context. It can be seen that an individual's goal orientation is affected by the social goal structure of the state they belong to. However, in this study, there was no difference between countries. In the online context, difference between goal orientation and academic achievement was not statistically significant in Korea, which is a collectivist culture, as well as in the US, which has an individualistic culture. This can be perceived as culture not having an influence in actual online learning; further, in online learning, the influence of individual goal orientation on academic achievement does not appear to vary depending on culture. According to previous studies, parents and learners from cultures that mainly have mastery goal orientation tend to share these goals, those from cultures that value collectivistic culture or comparisons tend to have performance goal orientation. However, unlike previous studies, findings of the current study confirms that cultural differences do not affect the relationship between individual goal orientation and academic achievement in online learning. In the future, it is necessary to examine the reasons for the absence of difference between cultures online comprehensively. Accordingly, it will be possible to lay the foundation for providing equal quality educational contents by reducing perceived differences among cultures.

Third, the effect size of the correlation between academic achievement and goal orientation varies according to goal orientation, a moderating variable. Specifically, the effect size of mastery goal orientation was higher than that of performance goal orientation in online situations. The results of this study, which showed that mastery goal orientation had a higher correlation with academic achievement than performance goal orientation in online learning, demonstrates that mastery goal orientation, as proposed by Lin and Wang (2018) and Delavar et al. (2015) had a positive effect on self-regulated learning strategies. This is consistent with the results of previous studies. These results suggest that the relationship between mastery goal orientation and performance goal orientation has a positive effect on long-term learning, both online and offline. Pintrich (2000) found that, in particular, students with mastery goal orientation used self-regulation strategies better in learning than students with performance goal orientation.

Implication

This study shows that in order to improve students' academic achievement and increase motivation in online learning situations, it is imperative to provide learning methods and tasks that can enhance self-regulation strategies for having mastery goal orientation. Learners with mastery goal orientation have motivation and interest in the learning body, prefer to acquire new knowledge or skills, and increase a sense of achievement by reaching the standards they have set; hence, they prefer challenging tasks and pursue adventures (Yeh et al., 2019). Therefore, it is necessary to increase student participation-led learning activities that arouse students' interest in learning in the online learning situation.

By weakening unnecessary comparisons of online learning while maintaining essential communication skills, it will be possible to enhance mastery goal orientation so that learners can fully focus on their own learning.

This study attempted to identify cultural differences related to online learning by analyzing studies in Korea and the US, which represent collectivism and individualism. However, due to the insufficient number of studies, it was difficult to analyze various variables and identify differences in online learning from various perspectives. Therefore, if research related to online learning is sufficiently conducted in the future, it will be possible to identify various differences related to culture in online learning.

Conclusion

Despite the above-mentioned limitations, this correlation meta-analysis was able to examine average effect size of variables related to goal orientation. A better understanding of which related factors are associated with goal orientation provides an opportunity to improve academic achievement and increase motivation in online learning situation. Although the online learning situation is a structure with little to no interaction or comparison with others, it was found that mastery goal orientation, which is more invested in learning rather than comparison with others, is effective for learning. Therefore, by using these characteristics of the online learning situation, it will be easier for learners, who are sensitive to comparison with others, to develop a learning system to help them focus on their own learning. Through online learning, mastery goal orientation can be strengthened through the experience of focusing more on one's achievements rather than comparing with others. By solidifying mastery goal orientation, learners will be able to focus on their learning even if they are compared with others later.

There should not be a lack of basic necessary parts for learning, such as interpersonal skills and interaction with teachers. Therefore, by weakening unnecessary comparisons of online learning while maintaining essential communication skills, it will be possible to enhance mastery goal orientation so that learners can fully focus on their own learning.

Author contribution All authors listed have significantly contributed to the development and the writing of this article.

Data availability Datasets will be available from the corresponding author at helalj@bu.ac.kr on reasonable request.

Declarations

Conflict of Interest The authors declare that they have no conflicts of interest.

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