Relationships among Learning Authenticity, Motivation, and Achievement in Web-Based Project Learning

Myunghee Ju Kang
Ewha Womans University, Korea

Hee-Jung, Yoon
Ewha Womans University, Korea

Ji Sim Kim
Ewha Womans University, Korea

Abstract: This study investigated the relationship among learning authenticity, motivation, and achievement in web-based project learning. Sixty-eight undergraduates who attended a web-based project were participants. Following are the results: 1) Learning authenticity predicted motivation ($\beta = .672$, $p < .05$) and achievement ($\beta = .554$, $p < .05$), 2) Motivation predicted achievement ($\beta = .583$, $p < .05$). 3) Motivation mediated the relationship between learning authenticity and achievement. More specifically, task value and self-efficacy were two mediating sub-variables under motivation where resource authenticity predicted perceived achievement. Implications for enhancing learning authenticity and suggestions for future research were discussed.

Keywords: learning authenticity, motivation, achievement, web-based project learning

Introduction

Constructivists are challenging the traditional learning environment insisting to meet the needs of real-life and provide the opportunities to explore ill-defined problems. A web-based project learning environment could be in line with constructivism where learners struggle to complete the given project using various learning resources on the web, interacting with their peers and experts synchronously and asynchronously. This open and flexible learning environment presents new challenges for instructional designers to create an authentic learning environment where students freely explore, share, and generate ideas and deliverables (Zembal-Saul et al., 2002).

Learning authenticity here is defined as a level of students’ perceived authenticity on how realistic of the learning process. Since learning authenticity is a multi-faceted factor, it does not exist in the learner, the task, or the environment itself, but in the dynamic interactions among these components (Barab, Squire, & Dueber, 2000; Güllkers, Bastiaens, & Kirschner, 2004; Herrington, Oliver, & Reeves, 2003; Hung & Chen, 2007). In spite of the complex aspect of learning authenticity, previous studies treated this variable very simple and mainly focused on task authenticity. Yet, the results were not clear on the relationship between task authenticity and learning outcomes (Hung & Chen, 2007; Jo & Lim, 2002). In order to proceed further in the research area of learning authenticity, not only the dimensions of multi-faceted authenticity but empirical validation on the impact of learning authenticity should be tested rigorously.

Previous research indicated the possible relationship between learning authenticity and motivation. Petraglia (1998) advocates the positive relationship stating that learning authenticity itself contributes to the promotion of learning motivation without any extra effort of motivational intervention. Students acquire knowledge that meets their practical needs and explore the solutions to questions connected directly to their real-life experience. They actively participate in learning experience if high level of motivation is enhanced by learning authenticity (Schwartz, Brophy, & Bransford, 1999). Research, however, reports conflicting results on the relationship between authenticity and motivation. For example, some research report that students persevere their learning with high learning authenticity (Ames, 1992; Hung & Chen 2007; Kang & Kim, 1999; Petraglia, 1998; Park & Kim, 2004), but others report that learners who work in an authentic environment did not perform better than those who are in a less authentic environment (Gulikers, Bastiaens, & Martens, 2005).
To identify the relationship between learning authenticity, motivation, and achievement, the present study examined a web-based project learning context which requires learners’ highly-motivated. Research problems set for the research are:

1) Does learning authenticity predict motivation and achievement?
2) Does motivation predict achievement?
3) Does motivation mediate the relationship between learning authenticity and achievement?

Theoretical Background

Learning Authenticity

Learning authenticity which is defined as students’ perception on learning process and environment has potential to foster meaningful learning (Petraglia, 1998). Project learning with high level of learning authenticity encourages students in investigation through an inquiry process structured around complex, authentic tasks (Buck Institute for Education, 2001). Given an authentic task, Students pursue solutions by testing their hypothesis, designing action plans, negotiating their ideas, making predictions, collecting and analyzing data, and drawing conclusions (Blumenfeld et al., 1991). Moreover, in a web-based project learning environment, students are able to access information easily, interact with other peers, utilize various resources, and elaborate their knowledge based on asynchronous collaboration. Learning authenticity, therefore, could be composed with four areas such as learning activities, tasks, resources and assessment.

Authenticity of activities

Constructivism has placed the students’ activity at the heart of the curriculum (Reeves, Herrington, & Oliver, 2002). Within this philosophy, research suggests that authentic activities provide the opportunity for students to approach the task from different perspectives through collaboration (Herrington, Oliver, & Reeves, 2003; Roelofs & Terwel, 1999). Honebein and his colleagues (1993) argued that learning authenticity can be enhanced by project learning which entails activities and sub-activities required to complete the project. Similarly, Roelofs and Terwel (1999) distinguished authentic pedagogy such as cooperation and communication that is based on Newmann, Marks, and Gamoran (1996). These views imply that learners’ authenticity of activities can be fostered when they engage in the collaboration with share of information, interaction for examining different perspectives, and deep reflection for negotiating their thought.

Authenticity of tasks

Complex tasks with proper level of challenges and realistic situations could be one dimension of learning authenticity (Herrington, Oliver, & Reeves, 2003; Honebein, Duffy, & Fishman, 1993; Kang & Kim, 2000; Petraglia, 1998; Roelofs & Terwel, 1999). First of all, authentic tasks should be connected to students’ personal worlds (Guilkers, Bastiaens, & Kirschner, 2004; Roelofs & Terwel, 1999). Students may encounter realistic cognitive conflict with tasks. Complex tasks also include genuine constraints such as deadlines and time allowances (Herrington & Oliver, 2000). Students perceive tasks as authentic if they examine the real issues of tasks and look for alternatives over a sustained period of time.

Authenticity of resources

By richness of learning resources, web-based learning environments can be distinguished from traditional learning environments. Authentic learning environments take advantages of rich resources. Multiple resources allow students to utilize practical resources by expanding them beyond texts to such sources as schedules, maps, and charts (Herrington, 2005; Rule, 2006). In order to construct final products, students capture rich information, manipulate enormous information, and reinterpret that information. Students can leverage quality of their outcomes with resources that practitioners may employ. Authenticity of resources based on web technologies may foster learner’s active learning and diminish learners’ perceived gap between learning and practice.

Authenticity of assessment

Recent research emphasize that authentic learning should be seamlessly integrated with assessment (Guilkers, Bastiaens, & Kirschner, 2004; Herrington, 2005; Herrington, Oliver, & Reeves, 2003; Kim, 2007; Woo et al., 2007). It is important that authentic assessment should resemble the social processes in reality and integrated into learning.
process (Guilikers, Bastiaens, & Kirschner, 2004). Gulikers and his colleagues (2004) identified five dimensions of authentic assessment: the physical context, the social context, the assessment of tasks, the assessment of result, and the assessment of criteria. These dimensions should be integrated to learning process.

**Motivation**

Learning from a realistic and complex project requires learners’ high level of motivation. If students are not motivated to learn, they are less likely to invest the time in their learning and thus will not benefit from its learning. Reversely, learners with high level of motivation can participate actively in learning experience. Learning process therefore promote motivation by providing the authenticity of learning (Schwartz, Brophy, & Bransford, 1999; Petraglia, 1998).

Expectancy and value components of motivation are important for predicting students’ actual achievement (Pintrich & Schunk, 2002). Four proximal factors were defined based primarily on an expectancy-value model by Pintrich and his colleagues (1991): goal orientation and task value as value components and attribution and self-efficacy as expectancy components. These are the factors to be considered in learning authenticity.

**Goal orientation**

Goal orientation refers student's general orientation to the course as a whole (Pintrich, Smith, Garcia, & McKeachie, 1991, p. 9) and how learners approach and engage in learning tasks (Ames, 1992; Pintrich & Schunk, 2002). Two goal orientations, mastery and performance goal, are generally mentioned in recent studies. Mastery goal orientation focuses on learning new skills, improving or developing competencies, and trying to gain understanding or insight for self-improvement. Performance goal orientation rather focuses on demonstrating ability relative to others and striving to be the best in the classroom. Research reported that goal orientation is strongly related with achievement (e.g. Bong, 2008; Hulleman, Durik, Schweigert, & Harackiewicz, 2008; Roebken, 2007).

**Task Value**

Task value refers to students' perception on how interesting, how important, and how useful the task is (Pintrich et al., 1991; Wigfield & Eccles, 1992). Earlier cognitive perspective on motivation stressed expectancy of success and value of tasks which various motivation theories were based on (Pintrich & Schunk, 2002). If students don’t value the task, they will be less likely to choose to engage in task, consequently, they will not gain knowledge. Reversely, the more students perceive the importance and meaningfulness of tasks, the more they persist at learning and acquire knowledge, not giving up when they faced with failure. For example, Hulleman, Durik, Schweigert, & Harackiewicz (2008) examined the antecedents and consequences of task value in two learning contexts: a college classroom and a high school sports camp and the result showed that task value predicted actual performance.

**Attribution**

Weiner postulated that students attribute success or failures of their outcomes to factors such as ability, effort, task difficulty, and luck (Zimmerman & Schunk, 2007). In attribution theory, learning outcomes are determined by causal dimensions (Pintrich & Schunk, 2002). When students believe that their effort to learn will result in positive outcomes, they are more likely to study more strategically and effectively (Pintrich et al., 1991). For example, Uquak, Elias, Uli, & Suandi (2007) showed that people who attribute their own failure to their own ability and efforts can recover failures and move on to adaptive ways of coping and achievement.

**Self-efficacy**

Self-efficacy refers to judgments of personal capabilities to organize and execute courses of action required to attain designed types of goals (Bandura, 1997). Self-efficacy are contextually specific in that they refer to specific performance situations depended on properties such as the conditions of learning or an attribute of tasks (Zimmerman & Schunk, 2007). Previous studies reported self-efficacy as representative motivation on achievement (Bandura, 1997; Bong, 2008; Pintrich & Schunk, 2002; Zimmerman & Schunk, 2007). For example, Bong (2008) reviewed the importance and socio-cultural factors of self-efficacy, goal orientation, task value, and attribution related to adolescents' cognition, affect, and behavioral patterns in achievement settings. She contented the link between self-efficacy and Korean adolescents' academic achievement.
Relationships between learning authenticity, motivation, and achievement

Although few studies have addressed the link between learning authenticity and motivation, some research suggested that learning authenticity promoted learners’ motivation (Ames, 1992; Hung & Chen, 2000; Kang & Kim, 1999; Petraglia, 1998; Park & Kim, 2004). Ames (1992) contended that classroom structures including tasks contribute to student’s goal orientation. Also, whether students are oriented to their goals has consequences for whether they try hard and take on challenges. He suggested that task, assessment and recognition, and authority dimensions of classrooms are presented as examples of structures that can influence children's orientation toward different achievement goals. Kang and Kim (2000) found that there was a significant difference in the learner's motivation (ARCS) by the levels of authenticity. Hung and Chen (2007) implied the importance of authenticity of task in that when the tasks are interesting to the learners and related to their life, learners can participate in solving the tasks. Park and Kim (2004) indicated that there was the improvement of learners’ self-efficacy and interest by utilizing authentic resources.

Learning authenticity, also, is thought to serve as a predictor of achievement (Kang & Kim, 1999; Kim, 2007; Elliot & Langlois, 2002; Woo et al., 2007). Elliot and Langlois (2002) showed that action research implementing authenticity of activities could improve students’ learning and diminish achievement gaps among low-progress and high-progress learners. Kim (2007) suggested that authentic assessment and immediate feedback focusing on students’ learning process have a positive influence over students’ products. In Woo and her colleagues (2007), students reported that the authentic tasks fostered positive feelings of learning and achievement.

Research on motivation reported that motivation was a strong predictor of achievement (Bandura, 1997; Hill & Hannafin, 1997). Hill and Hannafin (1997) supported the link between self-efficacy and achievement by findings that perceptions of self-efficacy influenced the strategies learners used. Oh (2003) examined relationship between sex-role identity, locus of control and academic achievement level. The results indicated that those who attributed their success to internal locus of control had a higher academic achievement level.

Mediating role of self-efficacy between task complexity and students’ performance were identified by Kitsantas and Balyor (2001) and Mangos and Steele-Johnson (2001). For example, Mangos and Stelle-Johnson (2001) identified that the effect of subjective task complexity on performance was mediated by self-efficacy in a computerized simulation of a class scheduling task.

Methods

Participants

Participants were 68 undergraduate students who enrolled in introductory Educational Technology course at a university in Korea. Participants were randomly assigned to one of fourteen teams to perform a project collaboratively.

Context

They conducted a project in Cyber Campus, given the task to investigate Educational Technology in practice. Based on the process of Jo (1999) and Lee (2001), the project lasted for five weeks as they planned, conducted, presented, and assessed their project collaboratively. First, students planned to do their project assigning their roles and questioning about solve the task, creating a timeline, and determining the required resources. In conduct phase, they carried out their action plans by exploring related theories and methodology and then, analyzing cases in practice. In addition, they visited and interviewed the practitioners. In the presentation phase, they produced final outcomes with multimedia and exhibited them. In the assessment phase, they evaluated other team products. Also, students submitted a short paper on a topic out of other team individually. After completing project, all participants were asked to answer learning authenticity, motivation, and perceived achievement questionnaire.

Measures

Based on theoretical review of learning authenticity (Gulikers, Bastiaens, & Martens, 2004; Herrington, Oliver, & Reeves, 2003; Herrington, 2005; Honebein, Duffy, & Fishman, 1993; Roelofs & Terwel, 1999) and the scale of authenticity of tasks (Kang & Kim, 1999), four factors were identified by an EFA (Exploratory factor analysis).
Principal axis factoring method was used to extract factors. To rotate factors, direct oblimin rotation method was used. Scree test with visual inspection was also used to determine the number of factors to be extracted. We labeled the four factors as: activity authenticity, task authenticity, resource authenticity, and assessment authenticity. Each question was scored on a 5-point Likert Scale. The reliability of fourteen items was Cronbach $\alpha = .88$. Some sample statements used for this subscale were: “I exchanged opinions with other participants while still maintaining a sense of respect.” for activity authenticity, “I think task was valuable and meaningful to me.” for task authenticity, “I utilized a variety of sources to solve the task.” for resource authenticity, and “When given task, criteria for assessment was provided.” for assessment authenticity.

Motivation items were adapted and modified from MSLQ (Pintrich et al., 1991). It consisted of 26 questions that measured four factors: goal orientation, task value, attribution, and self-efficacy. The reliability of items was Cronbach $\alpha = .88$. Each question was scored on a 5-point Likert Scale. Some sample statements used for measuring the learning strategy were: “Getting a good grade in this class is the most satisfying thing for me right now.” for goal orientation, “It is important for me to learn the course material in this class.” for task value, “If I don't understand the course material, it is because I didn't try hard enough.” for attribution, and “I'm certain I can understand the most difficult material presented in this course.” for self-efficacy.

Achievement was measured by four aspects: discussion, perceived achievement, individual and team performance. Discussion. All messages posted by students on the discussion board during the project were coded based on Fung’s 4 categories (Fung, 2004): academic, building relations, support, and appreciation. One of author and a research assistant counted the total number of messages and rated them on a 5-point Likert Scale. Inter-rater reliability was .92. Individual and team performance. Two raters working on analyzing individual and team performance. They adapted and modified a set of detailed criteria from previous studies (Kang & Kim, 2002; Kang & Kwon, 2004; Kwon, 2002): logicality, organization, and creativity for individual performance and accomplishment, relatedness, logicality, and creativity for team performance. They rated them on a 5-point Likert Scale and inter-rater reliability was .91. Perceived achievement. Items measuring perceived achievement with five items were adapted and modified from Shin (2003). The reliability of modified items was Cronbach $\alpha = .74$. Some sample statements used for measuring the achievement were: “I mastered knowledge and skill from learning”.

Results

Collected data were analyzed using Pearson’s correlation and multiple regression. Significant level for all results was set at .05.

Correlation analysis

Correlations among all of the measurements are analyzed with Pearson’s r coefficient. The result showed that learning authenticity was significantly positively related to motivation ($r = .67, p < .05$) and achievement ($r = .55, p < .05$). Also, motivation was found to be correlated significantly positively with achievement ($r = .58, p < .05$).

Correlations for sub-variables are presented in Table 1. The result indicated positive correlation between task authenticity and task value ($r = .62, p < .05$). Resource authenticity was significantly related to self-efficacy ($r = .60, p < .05$). Also, task value was found to be correlated significantly with perceived achievement ($r = .70, p < .05$) and self-efficacy correlated significantly positively with perceived achievement ($r = .66, p < .05$).

<table>
<thead>
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<tr>
<td>2. Task authenticity</td>
<td>.349*</td>
<td>-</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Resource authenticity</td>
<td>.523*</td>
<td>.299*</td>
<td>-</td>
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<td></td>
<td></td>
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<tr>
<td>4. Assessment authenticity</td>
<td>.549*</td>
<td>.457*</td>
<td>.429*</td>
<td>-</td>
<td></td>
<td></td>
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<tr>
<td>5. Goal orientation</td>
<td>.071</td>
<td>.206</td>
<td>.151</td>
<td>.061</td>
<td>-</td>
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</table>
Predicting of Learning Authenticity on Motivation and Achievement

**Predicting of Learning Authenticity on Motivation**

The simple regression analysis revealed that learning authenticity accounted for 45.1% of variance in motivation, $F(1, 66) = 54.201, p < .05$, and learning authenticity predicted motivation significantly, $\beta = .672$ (see Table 2). In the multiple regression analyses of sub-variables, first, no statistical significant result was found in regression analysis on goal orientation. Next, the result indicated that variables entered into equation accounted for 55.4% of variance in task value, $F(4,63) = 19.603, p < .05$, and task value was significantly predicted by task authenticity, $\beta = .435$, and resource authenticity, $\beta = .253$. Also, resources authenticity was found to account for 21.5% of variance in attribution, $F(4,63) = 4.302, p < .05$, and it was only found to predict attribution significantly, $\beta = .298$. Lastly, the result showed that resource authenticity accounted for 40.5% of variance in self-efficacy, $F(4,63) = 10.718, p < .05$, and it predicted self-efficacy significantly, $\beta = .471$.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>$\beta$</th>
<th>t</th>
<th>p</th>
<th>$R^2$</th>
<th>F</th>
<th>p</th>
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<td>Motivation</td>
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<td>.105</td>
<td>.672</td>
<td>7.362*</td>
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<td>.451</td>
<td>54.201*</td>
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<tr>
<td>Task value</td>
<td>Task authenticity</td>
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<td>.191</td>
<td>.435</td>
<td>4.546*</td>
<td>.000</td>
<td>.554</td>
<td>19.603*</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Resource authenticity</td>
<td>.437</td>
<td>.175</td>
<td>.253</td>
<td>2.503*</td>
<td>.015</td>
<td>1.05</td>
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</tr>
<tr>
<td>Attribution</td>
<td>Resource authenticity</td>
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<td>.127</td>
<td>.298</td>
<td>2.223*</td>
<td>.030</td>
<td>.215</td>
<td>4.302*</td>
<td>.004</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Resource authenticity</td>
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<td>.224</td>
<td>.471</td>
<td>4.035*</td>
<td>.000</td>
<td>.405</td>
<td>10.718*</td>
<td>.000</td>
</tr>
</tbody>
</table>

$p < .05$

**Predicting of Learning Authenticity on Achievement**

Table 3 presents a significant predictive relationship between learning authenticity and achievement. The result indicated that 30.7% of variance in achievement was explained by learning authenticity, $F(1, 66) = 29.237, p < .05$, and learning authenticity predicted achievement, $\beta = .554$. On relationships among sub-variables, also, the result showed that discussion was predicted by resource authenticity, $\beta = .368$, no predictor variables was found on individual performance, team performance was predicted by only task authenticity, $\beta = .368$, and perceived achievement was predicted by only resource authenticity, $\beta = .418$. 

Table 2 Results of Regression Models for Predicting of Learning Authenticity on Motivation

![Table 2](image-url)
Table 3 Results of Regression Models for Predicting of Learning Authenticity on Achievement

<table>
<thead>
<tr>
<th>Dependent variables/Sub-variables</th>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>R²</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
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<td>Achievement</td>
<td>Learning authenticity</td>
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<td>.027</td>
<td>.554</td>
<td>5.407*</td>
<td>.000</td>
<td>.307</td>
<td>29.237*</td>
<td>.000</td>
</tr>
<tr>
<td>Discussion</td>
<td>Resource authenticity</td>
<td>.744</td>
<td>.279</td>
<td>.368</td>
<td>2.670*</td>
<td>.010</td>
<td>.173</td>
<td>3.290*</td>
<td>.016</td>
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<tr>
<td>Team performance</td>
<td>Task authenticity</td>
<td>.469</td>
<td>.154</td>
<td>.368</td>
<td>3.040*</td>
<td>.003</td>
<td>.288</td>
<td>6.369*</td>
<td>.000</td>
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<tr>
<td>Perceived achievement</td>
<td>Resource authenticity</td>
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<td>.136</td>
<td>.418</td>
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</table>

*p < .05

**Predicting of motivation on achievement**

The simple regression analysis revealed that motivation accounted for 34% of variance in achievement, $F(1, 66) = 33.982, p < .05$, and motivation was found to predict achievement, $\beta = .583$ (see Table 4). In the multiple regression analyses of sub-variables, self-efficacy was only found to predict discussion, $\beta = .305$, perceived achievement was predicted by in order of task value, $\beta = .456$, and self-efficacy, $\beta = .377$. No statistical significant results were found in multiple regression analyses of predicting team and individual performance.

Table 4 Results of Regression Models for Predicting of Motivation on Achievement

<table>
<thead>
<tr>
<th>Dependent variables/Sub-variables</th>
<th>Independent variables</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>R²</th>
<th>F</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>Motivation</td>
<td>.134</td>
<td>.023</td>
<td>.583</td>
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<td>Discussion</td>
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<td></td>
<td>Self-efficacy</td>
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<td>.377</td>
<td>3.552*</td>
<td>.001</td>
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*p < .05

**Motivation as a mediator of learning authenticity on achievement**

The hypothesized mediating role of motivation on the relationship between learning authenticity and achievement was tested as specified by Baron and Kenny (1986) (see Table 5). First, in the model 1, learning authenticity was found to predict motivation significantly, $\beta = .672$. Next, in the model 2 in which tested the effect of learning authenticity on achievement without controlling for motivation, learning authenticity was found to predict achievement significantly, $\beta = .554$. In the mediated model 3 in which learning authenticity and motivation are entered into the same equation, motivation controlling learning authenticity was found to predict achievement. Through the same analyses for sub-variables, the results showed that task value and self-efficacy mediated the relationship between resource authenticity and perceived achievement.
Table 5 Results of Regression Models on the Motivation as a Mediator of learning authenticity on achievement

<table>
<thead>
<tr>
<th>Independent variables</th>
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<th>Achievement</th>
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</tr>
<tr>
<td>Learning authenticity</td>
<td>.672*</td>
<td>.554*</td>
</tr>
<tr>
<td>Motivation</td>
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<td></td>
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<tr>
<td>$R^2$</td>
<td>.451</td>
<td>.307</td>
</tr>
<tr>
<td>F</td>
<td>54.201*</td>
<td>29.237*</td>
</tr>
</tbody>
</table>

Discussion

Findings revealed the empirical relationship between the learning authenticity, motivation, and achievement. Even though further investigation is required, we can support the effects of learning authenticity and its consequences on motivation and achievement. Result showed that resource authenticity as well as task authenticity predicted motivation and achievement. It can be inferred that given task that was highly related to their subject, students could perceive the value of tasks and, hence, team performance was increased. This inference can be supported by Bleumenfeld and his colleagues (1991) that realistic tasks holding more relevance to students’ needs and experiences can promote students’ learning, because students can relate easily what they are learning to tasks and goals they see every day. At the same time, various types of materials and resources could provide students with the opportunity to inquire broadly and produce creative outcomes. Besides, high resource authenticity might increase perceived achievement in that when students participate actively in their project by capturing required information and manipulating multimedia to construct final learning outcomes, they felt the positive of self-efficacy and value of tasks by utilizing resources that practitioners may employ.

On the other hand, contrary to what was expected, the influence of activity authenticity and assessment authenticity on achievement was not evidenced for following reason. Activity authenticity and assessment authenticity can be lead by students’ active involvedness collaboratively and individually based on positive interdependency and individual accountability (Gulikers, Bastiaens, & Kirschner, 2004). However, as Kreijns and his colleagues (2002) mentioned, it can be seen that there are various degrees of disappointing collaboration and learning performances: low participation rates, inequality of role and accountability, and surface discussion, etc. Also, learners’ unfamiliarity and resistance to spontaneous evaluation caused them to fail to assess quality of learning.

Based on the findings, present study suggests some implications for designing strategies that foster learning authenticity in web-based project learning. First, authenticity is not only associated with specific component, but with all aspects of learning. As mentioned, various types of materials and resources can provide students with the opportunity to inquire broadly and produce creative outcomes. Also, although the predictability of activity authenticity or assessment authenticity has not been identified, it is important to provide natural opportunities for learners to test and refine their ideas and to construct meaningful knowledge collaboratively. Students need to assess their thinking about their activities and their products (Blumenfeld et al., 1991). Tools such as a schedule, checklist, and reflection note allow students to reflect and review their learning process by themselves. Second, based on high learning authenticity, motivation enables students to persevere with their learning. Hence, interventions aimed at promoting self-efficacy enable students to complete their learning. Another way to increase motivation is to encourage learners to challenge and synthesize the value of task through interactions with others.
References


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