

Modeling the relationship between motivational beliefs, cognitive learning strategies, and academic performance of teacher education students

Charles Magoba Muwonge^{1,2} , Ulrich Schiefele¹,
Joseph Ssenyonga^{2,3} and Henry Kibedi⁴

Abstract

Although self-regulated learning has received much attention over the past decades, research on how teacher education students regulate their own learning has been scarce, particularly in third world countries. In the present study, we examined the structural relationships between motivational beliefs, cognitive learning strategies, and academic performance among teacher education students in Uganda. The sample comprised of 1081 students selected from seven universities. Data were collected using several subscales from the modified Motivated Strategies for Learning Questionnaire and were analyzed by structural equation modeling. Cognitive learning strategies fully mediated the relationship between motivational beliefs and academic performance. Motivational beliefs contributed to students' academic performance mainly through influencing their critical thinking and organizational skills. Therefore, interventions to improve teacher education students' academic performance should focus not only on boosting their motivation but also on enhancing their use of cognitive learning strategies.

Keywords

Academic performance, Motivated Strategies for Learning Questionnaire, self-regulated learning, structural equation modeling, teacher education students

¹Department of Educational Sciences, University of Potsdam, Potsdam, Germany

²Department of Educational Foundations and Psychology, Mbarara University of Science and Technology, Mbarara, Uganda

³Department of Psychology, University of Konstanz, Konstanz, Germany

⁴Department of Psychology, Kyambogo University, Kyambogo, Uganda

Corresponding author:

Charles Magoba Muwonge, Department of Educational Foundations and Psychology, Mbarara University of Science and Technology, P.O. Box 1410, Mbarara, Uganda.

Email: charles_muwonge2002@hotmail.co.uk

The ability for learners to actively plan and monitor their learning through the use of motivational, behavioral, and cognitive strategies is defined as self-regulated learning (SRL; Pintrich, 2004). SRL generally encompasses students' motivational beliefs, their use of learning strategies, and the ability to evaluate the effectiveness of particular learning strategies upon performance (Zimmerman, 2008).

SRL has received much attention from researchers, due to its positive correlation with academic success (Pintrich, 2004; Rotgans & Schmidt, 2012). However, much research has focused on how teachers and teacher education students can promote SRL among their learners. The question of how teacher education students regulate their own studies still remains unclear, as research in this sector has been limited (Bembenutty, 2007; Saariaho, Pyhältö, Toom, Pietarinen, & Soini, 2016); this is especially true in third world countries.

SRL among teacher education students is important, as these later serve as models from which learners will emulate how to regulate their own learning (Saariaho et al., 2016). Based on the social learning theory (Bandura, 1977), this can be achieved when learners observe and/or imitate appropriate SRL techniques from the teacher education students especially during school practice sessions. Moreover, an in-depth understanding of teacher education students' motivation and learning styles is important in designing their curriculum. Therefore, in the present study, we examined the relationships between motivational beliefs, use of cognitive learning strategies, and academic performance of teacher education students in Uganda.

Given that previous studies (e.g., Muwonge & Ssenyonga, 2015) have indicated low academic achievements among teacher education students in Uganda, the present study is relevant in gaining a deeper understanding of the various factors contributing to the performance of these students. Moreover, the study findings could be adopted in designing interventions to improve teacher education students' SRL and performance at the university. Methodologically, the present study is superior to other related studies previously conducted in the Ugandan context because (a) it employs structural equation modeling (SEM) and (b) it uses a larger representative sample to examine the relationships between the study variables.

In the next sections, we describe the theoretical framework first, followed by the review of relevant literature before describing the methodology.

Theoretical framework

Several models have been advanced to explain the process of SRL (e.g., models by Boekaerts, 1999; Pintrich, 2000; Winne & Hadwin, 1998; Zimmerman, 2000). Some of them portray SRL as a four-phase process (e.g., Pintrich, 2000; Winne & Hadwin, 1998) while others portray SRL as consisting of three phases (e.g., Zimmerman, 2000). Although these models derive from different theories, their authors assume that SRL proceeds from a preparatory (preliminary) phase, through the performance phase to the appraisal phase following one's achievement (Panadero, 2017).

The preparatory phase includes students' motivational beliefs and cognitions about the self which they use to prepare for the forthcoming phase. Such beliefs may, among others, include (a) self-efficacy—a belief about one's capabilities to perform a task (Bandura, 1997), (b) task value—the importance that students attach to an academic activity (Wigfield, Hoa, & Kluvda, 2008), and (c) control of learning beliefs—the degree to which a student believes that academic outcomes are contingent on his or her own efforts other than external factors. In addition, during this phase, learners will enlist a range of strategies to employ in learning several concepts.

During the performance phase, learners employ various strategies listed in the forethought phase during the learning process. Pintrich (2004) stipulates that learning strategies vary from surface to deep cognitive learning strategies (such as organization, elaboration, and critical thinking). Organization refers to an active, effortful process of selecting relevant learning material and

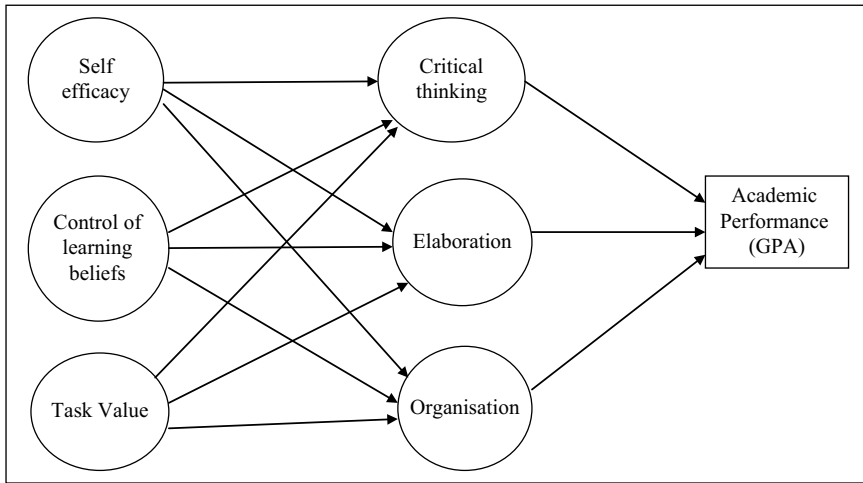


Figure 1. Structural model showing indirect contributions of motivational beliefs on academic performance of students. GPA: grade point average.

relating information that has been learnt while elaborative strategies such as summarizing content taught, and generative note-taking, among others, enable learners to expand on a concept to understand it more thoroughly. Critical thinking involves objective evaluation of a subject of discussion to come up with one's own judgment (Pintrich, Smith, Garcia, & McKeachie, 1991).

Academic performance is positively correlated with the use of deep learning strategies (Pintrich & DeGroot, 1990; Zimmerman, 2000, 2008).

During the self-reflection phase, a student compares his or her performance to that of other peers—a process called self-judgment. It is also during this phase that students draw causal attributions for their performance.

From the discussions above, it is evident that SRL follows three main stages (i.e., preparatory, performance, and appraisal)—and this influenced our conceptualization of the structural relationships between the present study variables shown in Figure 1. Based on theory, we hypothesized that motivational beliefs (preparatory phase) contribute to academic performance through the student's ability to use certain cognitive learning strategies (performance phase). Our assumption was that cognitive learning strategies mediated the relationship between teacher education students' motivational beliefs and their academic performance. In this study, three motivational beliefs were considered (i.e., self-efficacy, task value, and control of learning beliefs) as they are highly correlated with cognitive strategy use and academic performance (see Pintrich, 2004; Pintrich & DeGroot, 1990; Wigfield et al., 2008; Zimmerman, 2002, 2008).

Specifically, we sought to answer the following research question: Do cognitive learning strategies mediate the relationship between motivational beliefs and academic performance of teacher education students in Uganda?

Relations between motivational beliefs, use of cognitive learning strategies, and academic performance

The positive relationship between motivation and academic achievement is well documented in previous studies (e.g., Pintrich, 2004; Rotgans & Schmidt, 2012). For example, students who exhibit high self-efficacy and task value show better academic achievement compared to their

counterparts with low efficacy and value beliefs (Pintrich & DeGroot, 1990). Still, motivational beliefs have to be complemented by adaptive learning strategies for a learner to perform better (Rotgans & Schmidt, 2012). The latter statement indicates that even a highly efficacious student may perform poorly if he or she fails to adopt appropriate learning strategies. This implies that learning strategies mediate the relationship between students' motivational beliefs and their academic achievement, and this has been confirmed in a number of studies as explained below.

Rotgans and Schmidt (2012) examined the mediating role of learning strategies on the relationship between motivational beliefs and achievement in a sample of 1166 students at a polytechnic in Singapore. Motivational beliefs in this study included self-efficacy, task value, and goal orientations while learning strategies included, among others, organization, elaboration, and critical thinking. Preliminary results indicated positive correlations between motivational beliefs and learning strategies. A path analysis further indicated that learning strategies fully mediated the relationship between motivation and achievement. Therefore, as Rotgans and Schmidt (2012) assert, “. . . motivation seems to be a starter of the learning process; it does not directly control or regulate it, nor is this the case with learning strategies (which are directly controlled by motivation)” (p. 203).

These findings dovetailed with those of Fadlelmula, Cakigoglu, and Sungur (2013) who examined the structural relationships between motivational beliefs, learning strategies, and math achievement among 1019 seventh-grade students in Turkey. Similar to the former study, positive correlations were obtained between self-efficacy, learning strategies, and math achievement. In addition, a structural model confirmed that the relationships between motivation and math achievement were mediated by deep learning strategies. The mediation role of learning strategies on the relationship between motivational beliefs and achievement has also been demonstrated in studies conducted with high school students in Iran (Azar, Lasavani, Malahmadi, & Amani, 2010) as well as English learners in Singapore (Liem, Lau, & Nie, 2008).

On the contrary, other researchers have indicated that motivational beliefs have a direct effect on learners' performance. For example, Stegers-Jager, Cohen-Schotanus, and Themmen (2012) tested a model of relationships between motivational beliefs, learning strategies, participation, and performance of 672 first-year medical students. The study indicated a direct relationship between self-efficacy and performance of students. Similarly, using SEM, Yusuf (2011) noted that learning strategies did not mediate the relationship between self-efficacy and academic achievement among undergraduate students. Actually, the study concluded that self-efficacy directly influenced students' academic achievement.

Following from the above discussions, it is evident that research findings seem to be inconsistent, and hence inconclusive on the structural relationship between motivational beliefs, learning strategies, and students' performance. It appears that the relationships vary depending on the study population and study context.

In addition, it is important to note that studies investigating SRL among teacher education students have been sporadic and have been mainly conducted in Europe (e.g., Donche & Van Petegem, 2009; Saariha et al., 2016), Asia (e.g., İnan & Yuksel, 2010; Şen & Yilmaz, 2016), and North America (e.g., Bembenuddy, 2007; Perry, Hutchinson, & Thauberger, 2008). Moreover, many of the studies have been correlational in nature (Bembenuddy, 2007; Konrad, 2016; Marcou & Philippou, 2005). This leaves knowledge gaps on the structural relationships between the different variables related to SRL among teacher education students in low- and middle-income countries.

The question of how teacher education students in Uganda regulate their learning even remains unresolved as few studies have been conducted along this line of inquiry (e.g., Muwonge, Schiefele, Ssenyonga, & Kibedi, 2017b). Lack of studies focusing on the motivational aspects of learning and school achievement not only creates a knowledge gap in this aspect but also undermines the efforts

to provide sustainable pedagogical interventions necessary to improve on academic performance among teacher education students in developing countries like Uganda. There is a need to understand the interplay of factors that underpin the motivation and engagement of teacher education students in academic activities so as to provide proper educational guidance to Ugandan teacher education students whose performance is threatened by several factors. The present study, therefore, responds to the above knowledge gaps.

Methods

Participants

Participants in this study were students enrolled for a Bachelor of Science with Education (BSc Ed) degree program at undergraduate level. Students (here referred to as teacher education students) admitted on a BSc Ed program are trained to become teachers of science at secondary school level.

Uganda has 19 universities with students registered for this particular degree program. The program runs for 3 years on a full-time basis and is offered by the faculty of education or faculty of science education in the respective universities. Teacher education students offer science courses with a focus on physics, chemistry, biology, and mathematics in addition to professional courses like psychology and educational foundations. The teacher education students are offered a combination of two of the above science subjects as their major and minor teaching subjects. The curriculum followed in any of the above teaching subjects is similar across all universities and is accredited by the National Council for Higher Education—a regulatory body for all higher institutions of learning in Uganda.

Using computer-generated numbers, we randomly selected seven universities (36.8%). The selected universities had 1132 teacher education students who were all included in the study sample. Only 1081 respondents participated in the study giving a response rate of 95.5%. These were the respondents who were present during the days of data collection at the different universities. Every selected university had a minimum of 40 teacher education students in each year of study.

Participants were in the age range of 18 to 35 years with a mean age of 22 years (standard deviation [SD]=2.10). The majority of the students were males (79.6%), residing off-campus (66.6%), privately sponsored (51.6%), and were not engaged in any form of full-time or part-time employment (88.80%). Approximately equal numbers of students were in first and second years of study (i.e., 39.70% vs 34.20%, respectively) while the rest were in third year of study. The students' mean grade point average (GPA) was 3.62 (SD =0.48).

Instrument

A questionnaire consisting of three sections was used for data collection. The first section requested for biodata (i.e., sex, residence, year of study, sponsorship, and employment status) of the teacher education students. The second section consisted of one item that required students to indicate their GPA. GPA is a good predictor of students' academic performance compared to other indicators such as class attendance (Chorneau, 2014; Edwards, 2014).

The third section assessed teacher education students' motivational beliefs and cognitive learning strategies using subscales from the modified Motivated Strategies for Learning Questionnaire (MSLQ), which we obtained from the original MSLQ (by Pintrich et al., 1991) through confirmatory factor analysis (CFA). The MSLQ can be used to study SRL at curriculum level (i.e., all courses taken together; Rotgans & Schmidt, 2010, 2012) In this study, we used only three motivational beliefs subscales (i.e., self-efficacy, task value, and control of learning beliefs) and three subscales (i.e., elaboration, organization, and critical thinking) from the learning strategies section.

Responses on the MSLQ are rated on a 7-point Likert-type scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). The Cronbach alpha values reported for the different subscales are based on the results of the present study.

Self-efficacy was assessed using the eight-item self-efficacy subscale. A CFA led to deletion of two items from this scale as they exhibited low factor loadings. These items included “I expect to do well in this class” and “I’m certain I can understand the most difficult material presented in the readings for this course.” Therefore, the modified subscale had six items ($\alpha = .78$) which included “I believe I will receive an excellent grade in this program” and “I’m confident I can learn the basic concepts taught in my classes.” Control of learning beliefs were assessed by the control of learning beliefs subscale (four items; $\alpha = .61$). Examples of items in this subscale included “If I try hard enough, then I will understand the study material” and “If I study in appropriate ways, then I will be able to learn the material in this program.” Task value was assessed using the six-item task value subscale ($\alpha = .78$). Items on this subscale included “It is important for me to learn the material in class” and “I think I will be able to use what I learn in this program in my daily life.” Elaboration was assessed using the six-item elaboration subscale ($\alpha = .79$). Items on this subscale included “I try to relate ideas in different course units whenever possible” and “When I study, I write brief summaries of the main ideas from the readings and my class notes.” Organization was examined using a four-item organization subscale ($\alpha = .71$), which consisted of items such as “When I study the readings for this program, I outline the material to help me organize my thought” and “I make simple charts, diagrams, or tables to help me organize study material.” The five-item critical thinking subscale ($\alpha = .67$) was used to examine students’ critical thinking skills. The items in this subscale included “I treat the study material as a starting point and try to develop my own ideas about it” and “I try to play around with ideas of my own related to what I am learning in this program.”

Procedure

Permission to administer the questionnaire was sought from the university managements of the respective universities. Some lecturers were then contacted and requested to offer part of their lecture time for administering the questionnaires.

Data were collected by the first author with the help of two trained research assistants. During questionnaire administration, the first author explained to the participant’s relevant details about the study. Participants were allowed to ask questions for clarity before enrolling them in the study.

Participants consented to participate in the study before filling the questionnaires. After consenting to participate in the study, questionnaires were administered and the first author was present to give any clarifications on any concerns raised by the respondents. Students took 10 to 15 min to fill out the questionnaire. Participants were encouraged to complete any omitted items as they were handing in the filled questionnaire.

Ethical considerations

Ethical clearance was obtained from the Uganda National Council for Science and Technology (SS 3908) and Mbarara University of Science and Technology Research Ethics Committee (15/05-13). Participation was voluntary and participants were free to withdraw from the study at any time. All information collected was anonymous, confidential, and used for research purposes only.

Data analysis

Our analytic procedure followed three stages. Initially, we screened data to examine its suitability for SEM. Following Teo, Tsai, and Yang’s (2013) recommendation, data were screened for

(a) multicollinearity, (b) normality, (c) missing values, and (d) sample size requirements. We assessed multicollinearity by examining correlation coefficients between the items included in the analysis, and in line with the recommendation of Kline (2005), all correlations were below .85, implying lack of multicollinearity. Normality analyses indicated that some items were kurtotic, indicating univariate non-normality. Moreover, further analysis indicated multivariate non-normality; hence, the maximum likelihood estimation with robust standard errors (MLR) was used in all analyses as it is not affected by violations of normality (Wang & Wang, 2012). Some items had missing values of <1% and these were handled using the full information maximum likelihood (FIML) method. The FIML approach is more robust and gives reliable results compared to other techniques such as mean imputation (Wang & Wang, 2012). A minimum sample of 200 has been recommended for SEM (Tomarken & Waller, 2005); hence, the sample of 1081 used in the present study was adequate enough.

Second, we assessed the measurement model to determine data fit as recommended by Byrne (2012). The structural model was estimated thereafter. To examine whether learning strategies mediated the relationship between motivational beliefs and academic performance in the structural model, only indirect paths from motivational beliefs through cognitive learning strategies to academic performance were assumed in the first step (see Figure 1). In our view, motivational beliefs contribute to academic performance through the student's ability to use certain cognitive learning strategies. In the second step, direct paths from motivational beliefs to academic performance were added to the first model, to examine the direct contributions of motivational beliefs on academic performance. We then examined improvements in the model after addition of the direct paths in the second step using a chi-square difference test. A non-significant p value on the chi-square test would indicate that addition of direct paths from motivational beliefs to academic performance had not significantly improved the model, hence indicating no direct effects. This would imply that learning strategies fully mediated the relationship between students' motivational beliefs and their academic performance. We also examined the changes in the total and direct contributions on academic performance after addition of the above predictor variables. Since students' SRL vary as a function of their demographic characteristics such as sex (Pintrich & DeGroot, 1990), in the analysis we controlled for the effects of demographic variables.

Model fit was evaluated based on the following fit indices: comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). We followed the acceptable model fit criteria stated by Hu and Bentler (1999), who proposed CFI and TLI values close to or $\geq .95$, $SRMR \leq .08$, and $RMSEA \leq .06$.

Model estimations were conducted using Mplus 7.4 (Muthén & Muthén, 1998–2015). Compared to other statistical packages, Mplus offers the highest degree of flexibility as it allows for use of various forms (e.g., binary, ordinal, continuous, and censored) of variables in the analyses (Byrne, 2012). Moreover, Mplus can estimate multivariate models involving both latent and manifest variables—as it was the case in the present study.

Results

Correlations

Motivational beliefs were positively correlated with learning strategies ($p < .01$) as shown in Table 1. In addition, academic performance had a positive relationship with both motivational beliefs and the use of cognitive learning strategies ($p < .01$). This implies that students with high self-efficacy, high task value, and control of learning beliefs had higher GPA scores. The modest yet significant correlations between self-efficacy, task value, control of learning beliefs, and GPA are consistent with those obtained by Pintrich et al. (1991).

Table 1. Means, reliabilities, and correlations between the variables.

Variable	M	SD	1	2	3	4	5	6
1. Self-efficacy	5.64	0.94	.78					
2. Task value	5.82	1.01	.45*	.78				
3. Control of learning beliefs	4.87	1.47	.31*	.25*	.61			
4. Organization	5.13	1.27	.36*	.35*	.17*	.71		
5. Elaboration	5.55	1.11	.46*	.43*	.22*	.62*	.79	
6. Critical thinking	4.99	1.25	.43*	.39*	.24*	.54*	.51*	.67
7. GPA	3.62	0.48	.14*	.14*	.13*	.15*	.12*	.18*

SD: standard deviation; GPA: grade point average.

Values written diagonally (in bold) correspond to the Cronbach alpha values of the subscale.

* $p < .01$.

Table 2. Standardized parameter estimates showing direct, indirect, and total effects of motivational beliefs on cognitive learning strategies and academic performance.

Variables	Task value			Control of learning beliefs			Self-efficacy		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Academic performance	.02	.23	.25	.04	.19	.23	.07	.03	.10
Critical thinking	.33		.33	.28		.28	.07		.07
Elaboration	.24		.24	.14		.14	.09		.09
Organization	.32		.32	.25		.25	.02		.02

Testing the measurement model

Fit indices indicated that the measurement model showed a good fit, that is, SRMR = .04, CFI = .94, TLI = .93, RMSEA = .03, and 90% confidence interval (CI) = [.027, .040]. Item loadings for the motivation beliefs and cognitive learning strategies subscales ranged between .41–.71 and .47–.71, respectively, and all loadings were significant ($p < .001$). Matsunaga (2010) recommends that factors should have loadings above .40; hence, the items for the latent variables included in the structural model were adequately assessing their respective variables.

Structural model

When indirect paths were included in the structural model in the first step, the model adequately fitted with the data as indicated by the fit indices (i.e., SRMR = .01, CFI = .99, TLI = .98, RMSEA = .03). In fact, inspection of the modification indices in the output indicated that no modification indices were above the minimum value (i.e., of 4), indicating that addition of direct paths from the motivational beliefs could not significantly improve the hypothesized structural model. To prove the latter assertion, the addition of direct paths produced a chi-square change of 5.64, which was not statistically significant ($p = .13$). Generally, this proved that motivational beliefs did not directly contribute to students' performance. Regression weights were then evaluated to show direct and indirect contributions of different self-regulatory constructs on teacher education students' performance as described below.

Task value ($\beta = .23, p < .001$) and control of learning beliefs ($\beta = .19, p < .001$) had significant indirect contributions on students' academic performance (see Table 2). However, the direct

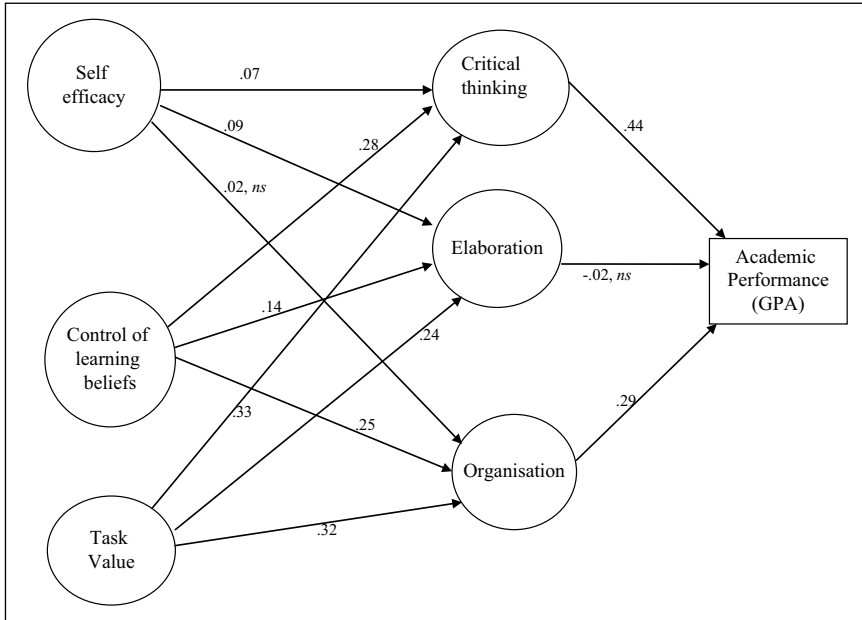


Figure 2. Structural model showing indirect contributions of motivational beliefs on academic performance of students. Standardized parameter estimates are indicated in the model above. GPA: grade point average.

contributions of task value ($\beta = .02$, $p = .18$) and control of learning beliefs ($\beta = .04$, $p = .35$) on academic performance were not statistically significant. The indirect contribution of task value on students' performance was mainly through critical thinking ($\beta = .14$, $p < .001$) and organization ($\beta = .09$, $p < .001$) but not elaboration ($\beta = -.01$, $p = .81$). Similarly, control of learning beliefs contributed to students' academic performance mainly through critical thinking ($\beta = .12$, $p < .001$) and organization ($\beta = .07$, $p < .001$) but not elaboration ($\beta = -.003$, $p = .80$). The total contribution of self-efficacy on students' academic performance was low ($\beta = .10$) but statistically significant ($p < .001$). Self-efficacy had significant contribution on students' GPA through enhancing their critical thinking only ($\beta = .03$, $p = .033$).

These results generally imply that the relationship between motivational beliefs and academic performance is mediated by cognitive learning strategies (mainly critical thinking and organization). As seen in Figure 2, task value was significantly related to students' critical thinking ($\beta = .33$, $p < .001$) and organization skills ($\beta = .32$, $p < .001$). Similarly, control of learning beliefs had significant contribution on students' critical thinking ($\beta = .28$, $p < .001$) and organization skills ($\beta = .25$, $p < .001$) but had a relatively low contribution on their elaboration skills ($\beta = .14$, $p < .001$). Compared to task value and control of learning beliefs, self-efficacy had very low contribution on the students' reported use of cognitive learning strategies. Motivational beliefs (i.e., self-efficacy, task value, and control of learning beliefs) explained 12%, 28%, and 23% of the variance in student's elaboration, organization, and critical thinking skills, respectively. Overall, all the constructs in the model explained 45% of the variance in students' academic performance with critical thinking ($\beta = .44$, $p < .001$) and organization ($\beta = .29$, $p < .001$), but not elaboration ($\beta = -.02$, $p = .87$), having the strongest contributions on students' GPA (see Figure 2).

Discussion

We examined SRL among Ugandan teacher education students. The findings were consistent with the various models of SRL in that findings indicated that learning strategies fully mediated the relationship between students' motivational beliefs and academic performance. Specifically, students' task value and control of learning beliefs strongly influenced their critical thinking and organization skills, which in turn strongly contributed to their academic performance. These results are in agreement with previous findings (Pintrich & DeGroot, 1990; Rotgans & Schmidt, 2012), which stipulate that students with high task value and control over learning exhibit high cognitive engagement and hence better academic achievement. This implies that teacher education students who attach a lot of importance on their studies, and believe that they were in control of their studies, reported more cognitive engagement in their studies and as such had better performance. Theoretically, our findings are consistent with the expectancy value theory of achievement motivation (Wigfield & Eccles, 2000), which stipulates that learners with high task value and control beliefs exhibit higher cognitive engagement in their studies compared to those with low task value and control beliefs. Therefore, teacher education students should be allowed to engage in projects that allow them to integrate challenges derived from their daily experiences into their lessons, so that they can appreciate the real-life applications of the concepts learnt in class.

In addition, when teaching, it is important to show the importance of course materials to the science teacher education students, in terms of their future employment, and in responding to their community needs. Instructors could also enhance teacher education students' task value and control of learning beliefs by providing models who value academic achievement and especially models who are similar (e.g., practicing teachers) to the teacher education students (Hoy & Spero, 2005). When teacher education students observe other teachers or their instructors engage in self-regulatory behaviors, they copy, imitate, and gain more confidence and mastery in the use of such behaviors—and this is consistent with Bandura's social learning theory. More so, teacher education students learn to value their studies and know that their personal effort will result into better academic performance.

In addition, teacher education students should be helped to have a strong control over their learning by actively engaging them in the lessons during teaching. Therefore, we advocate the use of learner-centered approaches such as problem-based learning and field visits in which teacher education students are exposed to real-life problems and given opportunities to work out solutions independently. Teacher education students should be given immediate feedback on their progress and should be valued as unique individuals, which enhances their control over learning. Therefore, instructors of teacher education students should adopt a "constructivist" approach of instruction in which teacher education students are empowered to (a) construct their own representations of reality through actively engaging them in the learning process and (b) learn by doing.

Teacher education students could also be advised to have learning journals, which involve a self-guided means of writing that allows reflection on the learning content (Cazan, 2012). Learning journals enable learners to reflect on the content learned and draw relationships between different ideas, while also improving their self-regulation capabilities (Moon, 2006), thereby enabling them to have control over their learning. In fact, Cazan (2012) has demonstrated that use of learning journals significantly improves students' use of critical thinking and metacognitive learning strategies. Such interventions will lead to increased task value and control over learning, which will enhance their cognitive learning skills, thereby leading to better academic performance.

Although self-efficacy had a positive contribution on teacher education students' reported use of cognitive learning strategies, its contribution was very low compared to other motivational beliefs. Our findings on self-efficacy contradict other studies (e.g., Berger & Karabenick, 2011;

Zimmerman, 2000), which found that self-efficacy was a strong predictor of students' use of learning strategies. This discrepancy could be attributed to the low levels of intrinsic motivation and self-efficacy among students who enroll for teacher-training programs in Uganda. According to the World Bank (2012) report, many students in Uganda join the teaching profession after failing to get admitted to their preferred degree programs such as engineering and medicine. In addition, it has been reported that students in developing countries join the teaching profession mainly for extrinsic reasons (Bastick, 2000; see also Muwonge et al., 2017a). With such low levels of intrinsic motivation, teacher education students may exhibit lower self-efficacy beliefs, and this explains why self-efficacy had low contribution on the use of learning strategies.

The lack of a relationship between motivational beliefs and teacher education students' use of elaboration skills was surprising, given that a number of studies have indicated that students' motivational beliefs (e.g., task value) influence the use of elaboration learning strategies (e.g., Berger & Karabenick, 2011; Pintrich & DeGroot, 1990). Although we may not have a plausible explanation for this finding, it is important to help teacher education students to expand on the concepts taught to them for better comprehension. This requires instructors to link previous knowledge to new content taught as well as using examples which teacher education students are well conversant with during teaching, on top of actively engaging them in the learning process.

The following limitations should be taken into consideration when interpreting the results of this study: First, the term "contribute" does not imply causality, as correlational data cannot be used to infer causal relationships. The term *contribute* in this study refers to the influence exerted by one variable on another. Second, the use of self-reported GPA to assess academic performance could have presented some methodological shortcomings. Although self-reported GPA is highly correlated to the actual GPA score (Cassady, 2001), we believe that using GPA scores obtained from the university administration would be more useful. We also recommend that other data collection approaches such as classroom observation, use of diaries, and interviews, among others, could be used for an in-depth understanding of the relationship between motivation, use of learning strategies, and academic performance of teacher education students in Uganda.

Conclusion

The results of the present study have indicated that learning strategies fully mediate the relationship between motivational beliefs and academic performance among teacher education students. This implies that teacher education students' motivational beliefs have to be complemented by use of appropriate learning strategies for academic success. Therefore, it is important that university administrators design interventions that not only increase the motivation of teacher education students but also improve on the use of various learning strategies in order to enhance their academic success.


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ORCID iD

Charles Magoba Muwonge  <https://orcid.org/0000-0002-5736-3588>

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