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Adapting the Motivated Strategies for Learning Questionnaire for a Writing and Communication Program

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Abstract

Integrating educational assessment tools, such as the Motivated Strategies for Learning Questionnaire (MSLQ), into university classrooms can help students and faculty gain insight into areas of strength and challenge for students. The present study adapted and integrated the MSLQ into a set of first-year communication courses for Faculty of Arts students at the University of Waterloo. This adaptation allowed us to better situate the scale within the writing and communication course context. Through exploratory and confirmatory analysis, a shortened questionnaire (MSLQ-AF) with six subscales (motivation, academic self-confidence, performance anxiety, critical thinking, planning for optimal learning, and peer learning) was created. MSLQ-AF proved to have stable factor structure, adequate and stable internal consistency, and construct validity (correlation with grades) when assessed across four samples spanning four university terms. We discuss the role of this new scale in helping students transition into university.

L'intégration d'outils d'évaluation pédagogique, tels que le questionnaire sur les stratégies d'apprentissage motivées (MSLQ), dans les salles de classe universitaires peut aider les étudiants et les professeurs à mieux comprendre les points forts et les défis des étudiants. La présente étude a adapté et intégré le MSLQ dans un ensemble de cours de communication de première année pour les étudiants de la Faculté des arts de l'Université de Waterloo. Cette adaptation nous a permis de mieux situer l'échelle dans le contexte du cours d'écriture et de communication. Grâce à une analyse exploratoire et confirmatoire, un questionnaire abrégé (MSLQ-AF) avec six sous-échelles (motivation, confiance en soi académique, anxiété de performance, pensée critique, planification pour un apprentissage optimal et apprentissage par les pairs) a été créé. Le MSLQ-AF s'est avéré avoir une structure factorielle stable, une cohérence interne adéquate et stable et une validité conceptuelle (corrélation avec les notes) lorsqu'il a été évalué sur quatre échantillons couvrant quatre trimestres universitaires. Nous discutons du rôle de cette nouvelle échelle pour aider les étudiants à faire la transition vers l'université.

Keywords: Motivated Strategies for Learning Questionnaire (MSLQ), student transitions, student success

Integrating educational assessment tools into university classrooms can help students and faculty gain insight into areas of strength and challenge for students. One such tool is the Motivated Strategies for Learning Questionnaire, also referred to as the MSLQ, which is a widely used assessment tool in educational research (Pintrich, 1991). The questionnaire is an 81-item instrument divided into 15 subscales. Broadly, these 15 subscales assess student motivation and use of specific learning strategies and resources within a particular learning environment. The instrument is grounded in cognitive information processing and social-cognitive learning theories which view students as active participants in learning (Schunk, 2005). Social-cognitive learning theories also acknowledge that students' beliefs and cognitions play an important role in how they learn, and that enhancing motivation can encourage deeper academic engagement (Pintrich & De Groot, 1990).

Understanding and influencing the academic adjustment of students, specifically first-year students, is of particular interest to staff and faculty in higher education settings. Crede and Phillips (2011) conducted a meta-analytic review of the use of the MSLQ in higher education and identified that the various MSLQ subscales tended to differ in their predictability of academic performance in specific courses. More specifically, some subscales demonstrated a higher correlation with grades than others and learning strategy use was found to mediate the effect of motivation on academic performance. Importantly, Crede and Phillips' review also suggests that the MSLQ is best suited to predict performance in specific classes rather than overall grade point average (GPA) scores.

Many studies have adapted the MSLQ in different learning contexts such as non-traditional nursing programs (Nagelsmith et al., 2012), introductory psychology courses (Tock & Moxley, 2017), medical programs (Cook et al., 2011) and Information Systems and Operations Management programs (Smith & Chen, 2015). The MSLQ has also been adapted in different languages including Chinese (Tong et al., 2020), Iranian (Feiz et al., 2013), Estonian (Saks et al., 2015), Punjabi (Nausheen, 2016) and Spanish (Ramirez-Echeverry et al., 2016), with the overall trend being that the original items do not accurately reflect their context, thus confirming the value in developing an adapted version. For example, Smith & Chen (2015) revised items from the original instrument to take the applied learning aspects computing courses into consideration. Exploratory and confirmatory factor analyses yielded a seven-subscale instrument – all with good internal consistency and reliability. The adapted scale allowed the researchers to use this tool to learn more about students' skill sets and to inform instructors about the skills that may need to be reinforced in class. In another study, Cook et al. (2011) adapted the MSLQ for a web-based medicine course with their analyses suggesting that a simplified version of the questionnaire consisting of five subscales (self-efficacy, intrinsic interest, test anxiety, attribution, and extrinsic goals) might be better at predicting student performance compared to the longer original version.

For the current context, the Student Success Office at the University of Waterloo initiated a collaboration with the Faculty of Arts in 2018, aimed at adapting and integrating the MSLQ within the Arts First program. The Arts First program is comprised of two mandatory first-year writing and communication courses designed to develop student communication, research, and analysis skills using a small group seminar approach. The learning outcomes from the program include development of peer collaboration skills, effective use of peer feedback, critical evaluation of information, development of self-awareness as a communicator, development of analysis and persuasion skills, and enhanced awareness of qualitative and quantitative data. Each section offers a unique content theme while each course (and all respective sections) utilizes a common assessment structure while being underpinned by a common pedagogical approach.

The main purpose of this study was to adapt the MSLQ to the Arts First program, explore its factor structure, and consider the value of a shortened questionnaire. Furthermore, we wanted to evaluate the stability of the new questionnaire's psychometric properties, as well as its merits as a student transition tool within the Arts First Program. Study one outlines the adaptation and outcomes of an exploratory factor analysis while study two employs a confirmatory factor analysis to assess our model fit and determine subscale reliability.

Study One

To adapt the original MSLQ scale (Pintrich, 1991) within the Arts First writing and communications course, several items were modified and a few more statements were added. The goal of study one was to explore the factor structure of the new scale. Furthermore, the modified scale consisted of 87 items and took a fairly long time to complete. As such, a secondary goal was to reduce the number of items in the scale through a series of reliability and confirmatory factor analyses while still improving its psychometric properties.

Methods

Participants and Procedure

Analyses were conducted on a sample of 216 students who completed the MSLQ questionnaire during weeks five and six of Fall 2018. Due to the nature of the study, gender and other demographic information were not accessible for research purposes. Participants were undergraduate students enrolled in the Arts First writing and communications program with most students being in first year. The study was approved by the Student Success Office in collaboration with the Arts First program. The use of the data was also approved by the University of Waterloo office of Research Ethics.

Measure

The MSQL (Pintrich, 1991) is a self-report questionnaire consisting of 81 items rated on a seven-point Likert scale ranging from "not at all true of me" to "very true of me." This questionnaire is broken down into 14 subscales with alpha levels ranging between 0.52 to 0.93 (Pintrich et al., 1993).

In preparation for the initial offering, we examined and modified the original questionnaire to better reflect the Arts First course goals, while also striving to maintain the integrity of the original items. The modified, program specific, Motivated Strategies for Learning Questionnaire – Arts First (MSLQ-AF Un-shortened) consisted of 87 items (Appendix B). While some items remained unchanged, some were removed altogether, and many were modified. In a few cases, new questions were added to address unique aspects of the program not covered by the MSLQ.

Given that the Arts First courses are focused on developing communications skills via active practice, words such as tests and quizzes on the original items were replaced with writing assignments and peer feedback. Other common modifications included replacing terminology referring to traditional studying or test-taking with assignment-based language. For example, the original question "I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying" became "I try to think through assignment feedback and decide what I am supposed to learn from it rather than just reading it over." Additionally, given that the program is seminar-based, class time is often used for discussion and similar active learning activities as opposed to lecturing. In response, some modifications included changing studying and lecture-focused language to address behaviours aimed at ensuring students are adequately equipped to participate in discussions about the course content. For example, "When I study for this course, I write brief summaries of the main ideas from the readings and the concepts from the lectures" became "I write brief summaries of the main ideas from the readings."

Some questions or subscales were removed entirely due to a lack of relevance for the communications courses. For example, it was decided that the rehearsal strategies section would be removed as traditional 'studying' and memorization techniques do not align with the pedagogical values underpinning the program. Finally, a series of new questions were added to further address program outcomes such as peer learning, critical thinking, and communication skills. For example, the question "When my classmates give me feedback on my assignments it helps me understand how my audience is reacting to what I write or say" was added to the peer learning subscale and the question, "When I use a source, I check what other published writers say about it" was added to the critical thinking subscale.

Results

Exploratory Factor Analysis

Exploratory factor analysis (EFA) was used to identify underlying factors within our set of questions**.** Employing a principal axis extraction method with a standard varimax rotation was conducted on the MSLQ-AF with the aid of "stats" R package (R Core Team, 2020). The number of factors were determined using parallel analysis (Horn, 1965). The method converged on a nine-factor solution. Roughly, mapping on the original MSLQ subscales, factor one mapped on the metacognition subscale, factor two on the self-efficacy subscale, factor three on task value subscale, factor four on time and study environment subscale, factor five on peer learning subscale, factor six lacked a clear mapping to the original subscales, factor seven mapped on both extrinsic subscale and performance anxiety subscale, factor eight on control of learning subscale, and factor nine with only two items lacked a clear mapping.

Many of the factors contained items that were cross loaded onto other factors. To shorten the scale while ensuring that factors uniquely measure separate constructs, items that cross-loaded across two or more factors were removed. In line with previous analysis recommendation, a relatively low loading coefficient of 0.3 was selected for removal cut-off to maximize the effect of removing cross factor contamination without removing too many items (Hair et al., 2010). Table 1 demonstrates the factor loadings and items that were removed. Following this process, factor nine, which originally had only two items, now has no items and was removed. Furthermore, factor eight now has only two items and since at least three items are needed to assess reliability, this factor was also removed. Following these procedures, 36 items were removed. Eight factors and 51 items remained at this stage (see Table 1).

Table 1

Exploratory Factor Analysis Factor Loadings (0.30 or Greater)

	F1	F2	F3	F4	F5	F6	F7	F8	F9
Q1		.30	.31						
Q2	.35							.35	
Q3			.31						
Q4							.56		
Q5							.61		
Q6							.56		
Q7							.44		
Q8			.71						
Q9			.73						
Q10			.64						
Q11			.76						
Q12	.35		.57	.41					
Q13			.45	.38					-.35
Q14	.40		.34	.38					
Q15			.72						
Q16								.55	
Q17								.38	
Q18			.33					.43	
Q19									
Q20		.35			.31			.32	
Q21		.65					.32		
Q22	.34	.51							
Q23		.74							
Q24	.33	.46							
Q25		.77							
Q26		.59					.34		
Q27	.43	.30	.44						
Q28		.69							
Q29		-.53					.31		
Q30		-.52					.39		
Q31		-.58							
Q32		-.44					.33		
Q33	.37			.37	.32				
Q34	.48		.40						
Q35	.55								
Q36									
Q37	.54								
Q38	.53		.33						
Q39									
Q40	.36								
Q41						.48			
Q42						.51	.31		.32
Q43	.33					.34			
Q44	.44	.30				.38			

	F1	F2	F3	F4	F5	F6	F7	F8
Q45	.49							
Q46	.66							
Q47	.51							
Q48								
Q49						.51		
Q50	.37				.34			
Q51				.41				
Q52	.33					.50		
Q53					.32			.30
Q54	.36							
Q55								
Q56	.35					.35		
Q57	.34							
Q58	.31	.33						
Q59				.31				
Q60	.34					.38		
Q61				.41				
Q62					.44			
Q63				.35				.31
Q64				.69				
Q65				.50				
Q66				.44				
Q67				.59				
Q68					.32			
Q69				.60				
Q70				.39				
Q71				.47				
Q72				.39	.41			
Q73		.34		.36				
Q74				.41				
Q75						.33		
Q76					.37	.45		
Q77						.59		
Q78					.62			
Q79					.56			
Q80					.45			
Q81					.60			
Q82					.54			
Q83						.37		
Q84	.33							
Q85					.48	.32		
Q86					.51			
Q87					.42	.47		

Note. Bolded items were removed.

Confirmatory Factor Analysis

The measurement model proposed by the EFA was tested using a confirmatory factor analysis (CFA), using the "lavaan" R package (Rosseel, 2012). Comparative fit index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Squared Residual (SRMR) are commonly used measures of fit – assessing the extent to which the observed data is consistent with the specified model (Hooper et al., 2008). CFI values greater than 0.900 are considered adequate and those greater than 0.950 are considered good. RMSEA values lower than 0.07 are considered adequate but values lower than 0.06 are considered good. SRMR values below 0.08 are considered good.

CFA indicated that the data fit was poor for the proposed model: CFI = 0.765, RMSEA = 0.059, SRMR = 0.080. Poor fit results from highly co-varied pairs of items and may be a further indication that the factors are not assessing unique constructs. To further improve the model fit, it was decided a priori to find the most co-varied pair of items and remove one member. The co-varied pair member that preserves the reliability of the factor will be retained. Twenty-two steps were taken during this procedure (see

Table **2**). At step 20, it was decided that the model will be retained for the following reasons: 1) Step 21 would prompt removal of a factor due to it containing fewer than three items – said factor had good reliability prior to this step; 2) The overall model fit was already acceptable at step 20; 3) The model fit had stopped improving and was displaying signs of worsening at Step 22. In total, 22 items were removed after this procedure. Seven factors and 29 items remained at this stage (see Table 2).

Table 2

Steps Taken to Improve Fit

Step #	Covaried pair/Decision	CFI
1	Q4 and Q5 - Q5 has smallest negative impact on alpha if removed	0.788
2	Q6 and Q7 - Q7 has smallest negative impact on alpha if removed	0.800
3	Q4 and Q6 - Q6 improves alpha if removed	0.814
4	Q54 and Q59 - Q54 has smallest negative impact on alpha if removed	0.825
5	Q37 and Q51 - Q51 has smallest negative impact on alpha if removed	0.832
6	Q9 and Q59 - Q59 has smallest negative impact on alpha if removed	0.842
7	Q40 and Q70 - Q70 has smallest negative impact on alpha if removed	0.845

8	Q62 and Q74 - Q74 has smallest negative impact on alpha if removed	0.848
9	Q8 and Q71 - Q71 has smallest negative impact on alpha if removed	0.857
10	Q3 and Q49 - Q3 Improves alpha if removed	0.864
11	Q77 and Q80 - Q80 has smallest negative impact on alpha if removed	0.870
12	Q64 and Q82 - Q82 has smallest negative impact on alpha if removed	0.876
13	Q40 and Q61 - Q40 has smallest negative impact on alpha if removed	0.884
14	Q62 and Q81 - Q62 has smallest negative impact on alpha if removed	0.885
15	Q9 and Q77 - Q9 has smallest negative impact on alpha if removed	0.890
16	Q75 and Q86 - Q86 Improves the fit if removed.	0.898
17	Q25 and Q69 - Q69 has smallest negative impact on alpha if removed	0.902
18	Q30 and Q57 - Q57 has smallest negative impact on alpha if removed	0.908
19	Q30 and Q35 - Q35 has smallest negative impact on alpha if removed	0.910
20	Q67 and Q78 - Q67 has smallest negative impact on alpha if removed	0.919
21	Q28 and Q29 - Q28 has smallest negative impact on alpha if removed. Note that this would mean removal of Factor 2 which has good reliability, and we are doing this when the overall fit is acceptable.	0.940
22	Q30 and Q11 - Q11 has smallest negative impact on alpha if removed. Note that fit is now reducing.	0.939

Internal Consistency

Internal consistency analysis was conducted on each of the seven new factors. Many researchers consider alpha of 0.7 or greater to be adequate, with fewer researchers using 0.6 as the cut-off (Taber, 2018). Based on these commonly used characterizations, the reliability of most factors is adequate (0.674-0.864). However, factor six had an alpha of 0.605 which is marginal, prompting closer inspection. Sometimes the removal of problematic items improves internal consistency, however removal of any item from factor six would have further reduced reliability below 0.600

[1]. Furthermore, at face value, it is difficult to understand exactly what is measured by this factor and it does not appear to have any logical mapping to any factor proposed for the original MSLQ (see Table 3 for items that form part of this factor). For these reasons, it was decided that factor six should not be included in the final version of the scale. Six factors and 24 items remained at this stage, and they represent the final shortened form of the MSLQ-AF (Appendix A). We propose the following names for our six factors (and their rough mapping to the original MSLQ factors): 1) Critical Thinking (Metacognition), 2) Academic Self-Confidence (Self-Efficacy), 3) Motivation (Intrinsic Value), 4) Planning for Optimal Learning (Time Management), 5) Peer Learning (Peer Learning), 6) Performance Anxiety (Test Anxiety).

Table 3

Factor Six items

Item Number	Item
Q41	I make simple charts, diagrams, or tables to help me organize course concepts.
Q49	When I use a source, I check what other published writers say about it.
Q75	When starting to work on an assignment, I often try to explain it to a classmate or a friend.
Q77	When completing work for this course, I often set aside time to discuss the course material with a group of students from the class.
Q83	Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.

Study Two

In the process of shortening the scale while attempting to improve the overall model fit, we ran the risk of overfitting the model to our data. Therefore, to confirm that the model continues fitting unseen data, we conducted CFA on the original Fall 2018 sample, as well as three additional unseen samples – that of Winter 2019, Fall 2019 and Winter 2020. Furthermore, we wanted to determine whether reliability of the factors

1 Chronbach's alpha of factor six is below 0.6 in two out of four samples studied.

also remained stable throughout our samples. Finally, we wanted to conduct construct validity analysis, evaluating how the scale factors correlated with each other but, most importantly, how they correlated to course GPA.

Methods

Participants, Measures, and Analysis

Four samples were collected from University of Waterloo undergraduate students enrolled in the Arts First courses within the Faculty of Arts between Fall 2018 and Winter 2020. Accounting for both a completed MSLQ-AF and final course grade, the year-to-year samples were 212 (Fall 2018), 236 (Winter 2019), 436 (Fall 2019), and 236 (Winter 2020). As with the first study, gender and other demographic information were not accessible for research purposes. The study was approved by the Student Success Office in collaboration with the Arts First program. The use of the data was also approved by the University of Waterloo office of Research Ethics. All analyses were done on the final and shortened six factor MSLQ-AF derived from study one. Confirmatory factor analysis, internal consistency analysis, correlations, and descriptive statistics were evaluated for each factor and sample studied.

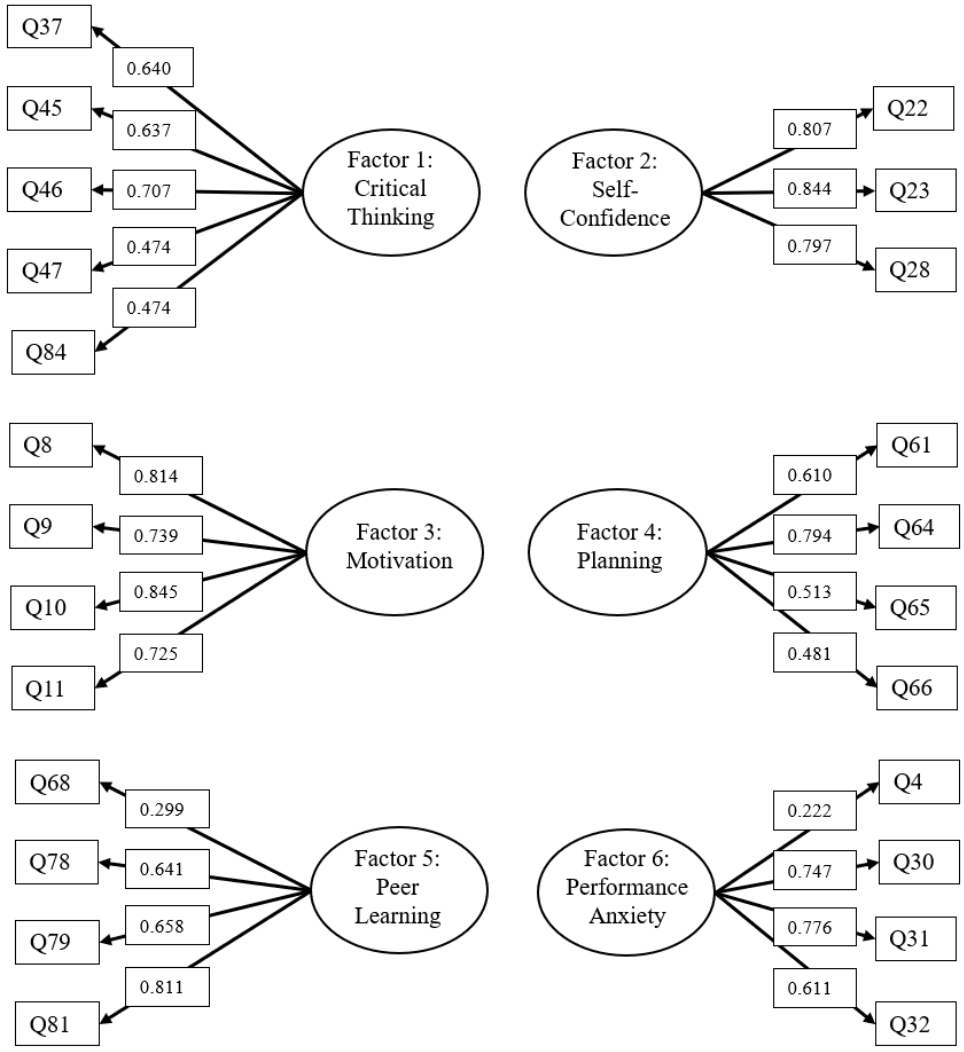
Results

Confirmatory Factor Analysis (CFA)

Data collected from all study terms demonstrated adequate and stable model fit. Fall 2018 model fit: CFI = 0.932, RMSEA = 0.047, SRMR =0.058 (**Error! Reference source not found.**). Winter 2019 model fit: CFI = 0.906, RMSEA = 0.052, SRMR = 0.064. Fall 2019 model fit: CFI = 0.911, RMSEA = 0.053, SRMR = 0.071. Winter 2020 model fit: CFI = 0.915, RMSEA = 0.058, SRMR = 0.072. These findings suggest that the procedure used in the scale construction stage did not merely overfit the model to the data (i.e., the fit was good for other terms beyond Fall 2018). Furthermore, this analysis suggests that these six factors are consistently measuring distinct constructs from term to term.

Figure 1

Measurement Model for MSLQ-AF (Standardized Solution) for Fall 2018 Sample



Internal Consistency and Descriptive Statistics

To determine internal consistency of the subscales, alpha was computed for each subscale and term. Results suggest adequate and stable reliability across all subscales (

Table **4**). Critical Thinking factor alpha ranged between 0.70 and 0.73. Academic Self-Confidence factor alpha ranged between 0.80 and 0.86. Motivation factor alpha ranged between 0.81 and 0.90. Planning for Optimal Learning factor alpha ranged between 0.63 and 0.67. Peer Learning factor alpha ranged between 0.63 and 0.71. Performance Anxiety alpha ranged between 0.64 and 0.70.

Table 4

Descriptive Statistics, Alpha, and Correlation with Final Course Grade of Each Factor Across Four Terms

Factors	Term	M(SD)	alpha	r with Final Course Grade
Critical Thinking	F18	4.70 (1.02)	0.71	0.06
	W19	4.84 (1.02)	0.72	0.17**
	F19	4.82 (0.95)	0.70	0.15*
	W20	4.89 (0.98)	0.73	0.17*
Academic Self-Confidence	F18	5.02 (1.18)	0.86	0.18*
	W19	5.09 (1.01)	0.80	0.18**
	F19	5.19 (1.04)	0.80	0.24***
	W20	5.21 (1.03)	0.80	0.35***
Motivation	F18	4.98 (1.05)	0.86	0.06
	W19	4.96 (1.03)	0.81	0.18**
	F19	5.32 (1.14)	0.85	0.14*
	W20	5.26 (1.21)	0.90	0.22**
Planning for Optimal Learning	F18	4.85 (1.00)	0.67	0.24**
	W19	4.78 (0.97)	0.63	0.21**
	F19	4.62 (0.75)	0.65	0.19*
	W20	4.57 (0.72)	0.67	0.20**
Peer Learning	F18	5.48 (0.88)	0.70	0.17*
	W19	5.53 (0.92)	0.63	0.13
	F19	5.97 (0.78)	0.64	0.21***
	W20	5.83 (0.82)	0.71	0.32***
Performance Anxiety	F18	4.67 (1.36)	0.70	-0.08
	W19	4.56 (1.32)	0.64	0.02
	F19	4.56 (1.36)	0.70	-0.05
	W20	4.62 (1.20)	0.68	-0.02

*** p < 0.05, ** p < 0.01, *** p < 0.001**

Construct Validity

To test whether factors are related to each other, as well as course grades, we computed a series of Pearson's correlations (

Table **4** & Table 5). Notably, all factors, except for Performance Anxiety, had small to moderate correlations among each other throughout all terms. The Performance Anxiety factor was generally not correlated with Critical Thinking, Planning for Optimal Learning, and Peer learning factors. However, the Performance Anxiety factor had a significant negative correlation with the Academic Self-Confidence factor across all terms (r between -0.33 and - 0.15). All factors, except Performance Anxiety, had a significant positive correlation with course grade in most terms (Critical Thinking and Motivation were not significant in Fall 2018; Peer Learning was not significant for Fall 2019).

Table 5

Correlations between all MSLQ-AF Factors and Course Grades, for all Samples

Fall 2018	Critical Thinking	Self-Confidence	Motivation	Planning	Peer Learning	Anxiet y
Self-Confidence	0.43***					
Motivation	0.44***	0.28***				
Planning	0.26***	0.37***	0.33***			
Peer Learning	0.29***	0.16*	0.35***	0.33***		
Anxiety	-0.24***	-0.33***	0.01	-0.09	-0.02	
Course Grade	0.06	0.18*	0.06	0.24**	0.17*	-0.08

Winter 2019	Critical Thinking	Self-Confidence	Motivation	Planning	Peer Learning	Anxiety
Self-Confidence	0.32***					
Motivation	0.55***	0.34***				
Planning	0.55***	0.37***	0.32***			
Peer Learning	0.33***	0.21**	0.33***	0.38***		
Anxiety	0.03	-0.20**	0.09	0.01	0.1	
Course Grade	0.17**	0.18**	0.18**	0.21**	0.13	0.02

Fall 2019	Critical Thinking	Self-Confidence	Motivation	Planning	Peer Learning	Anxiety
Self-Confidence	0.48***					
Motivation	0.44***	0.35***				
Planning	0.42***	0.34***	0.37***			
Peer Learning	0.29***	0.27***	0.42***	0.21***		
Anxiety	-0.06	-0.21***	0.15*	0.08	0.06	
Course Grade	0.15*	0.24***	0.14*	0.19*	0.21***	-0.05

Winter 2020	Critical Thinking	Self-Confidence	Motivation	Planning	Peer Learning	Anxiety
Self-Confidence	0.52***					
Motivation	0.58***	0.46***				
Planning	0.47***	0.36***	0.44***			
Peer Learning	0.45***	0.43***	0.51***	0.39***		
Anxiety	0.03	-0.15*	0.18*	0.13	0.16*	
Course Grade	0.17*	0.35***	0.22**	0.20**	0.32***	-0.02

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Academic Self-Confidence has been abbreviated to Self-Confidence. Planning for Optimal Learning has been abbreviated to Planning. Performance Anxiety has been abbreviated to Anxiety.

Discussion

Our study aimed to adapt the MSLQ within the Arts First program, which consists of writing and communication courses. The resulting shortened questionnaire (MSLQ-AF) consisted of six subscales. The number of subscales and the hypothesized construct measures parallel those seen in other adaptations (Cook et al., 2011; Smith & Chen, 2015). In shortening the scale, we were able to construct a robust questionnaire, whereby each subscale measures a unique construct and the factor structure of the overall questionnaire and internal consistency remained stable throughout four terms. Importantly, five out of six subscales were consistently correlated with grades, highlighting the utility of the MSLQ-AF as an educational assessment and transition tool within the Arts First program.

In our study, Critical Thinking, Academic Self-Confidence, Motivation, Planning for Optimal Learning, and Peer Learning subscales were generally correlated with course grade, which is also in line with previous work. For example, Jackson (2018) identified a similar pattern of subscale-grade correlations except for Peer Learning. In our study, the correlation between the Peer Learning subscale and course grade might be because peer leaning is a major component of the Arts First program courses and items were specifically modified to assess this outcome. The Performance Anxiety subscale tended to have no significant relationship with course grade. This lack of significance limits the utility of targeting performance anxiety to directly affect student performance. However, Performance Anxiety was consistently and negatively correlated with Self-Confidence and showed a positive relationship with Motivation (significant in two terms). Although current results do not speak directly to the causal relationship between these constructs, the results do suggest caution regarding implementing interventions that target Motivation which may come with some affective detriment (e.g., interventions that increase motivation may also lead to increases in performance anxiety). As such, interventions aimed at increasing motivation may be

best combined with performance anxiety reduction strategies. Alternatively, perhaps the focus should be on increasing academic self-confidence. Regardless, with five distinct constructs within the MSLQ-AF correlating with grade, it gives students and instructors multiple avenues to monitor student transition into university settings and potentially skills that will set students up for success in their future academic careers.

Crede and Phillips (2011) highlight practical applications of the MSLQ such as counselors or instructors using the scale to enhance student awareness of learning strategies. In our context, the MSLQ project serves two purposes: first, individual results and associated help-text (i.e., different strategies and on-campus resources available to students to improve certain skills) are shared with students so they can more easily identify strengths and areas for improvement regarding their learning skills and motivations.

Secondly, the MSLQ provides a rich source of data for instructors and student affairs staff who develop student support services. For example, the data gathered from a given cohort has been used to inform orientation programming and helped to identify academic and learning workshop topics that the cohort may benefit from most. As noted earlier, instructors are also given access to their own report which reflects the results of their aggregate class. This data provides valuable insight into the strengths and areas for development present in each of their classes in real-time. Several instructors have reported that this has allowed them to adapt their teaching to focus on developing the skills that their class scores low on, and to introduce new resources to support their students' lower scoring areas, and have meaningful discussions with their students for the remainder of the term.

Future Direction

As demonstrated in this paper, the MSLQ provides faculty and administrators with valuable insights into the strengths and challenges of students at key points in their studies. Thus far, the tool has been adopted by four of the six faculties at the University of Waterloo using the process outlined here. The long-term goal is to position this process and resulting scale as a tool for all first-year students. Use of the adapted MSLQ as a student-facing tool is aimed at helping participants develop more targeted and effective self-regulation since the transition from high school can be a challenge for many. Thus, a focus on developing student awareness and skill with regards to academic self-regulation is essential. To ensure the tool is as applicable as possible for each of the faculties and courses that utilize it, a similar adaptation process as outlined in this paper will be followed with future offerings as applicable.

References

Cook, D.A., Thompson, W.G., & Thomas, K.G. (2011). The Motivated Strategies for Learning Questionnaire: Score validity among medicine residents. *Medical Education*, *45*, 1230-1240. https://doi.org/10.1111/j.1365-2923.2011.04077.x

Crede, M. & Phillips, A.L. (2011). A meta-analytic review of the Motivated Strategies for Learning Questionnaire. *Learning and Individual Differences*, *21*, 337-346. https://doi.org/10.1016/j.lindif.2011.03.002

Feiz, P., Hooman, H.A., & Kooshki, S. (2013). Assessing the Motivated Strategies for Learning Questionnaire (MSLQ) in Iranian students: Construct validity and reliability. *Social and Behavioral Sciences*, *84*, 1820-1825. https://doi.org/10.1016/j.sbspro.2013.07.041

Hair, J. F., Black, W. C., Babin, B.J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis.* Pearson- Prentice Hall.

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53-60. https://doi.org/10.1016/j.sbspro.2013.07.041

Jackson, C.R. (2018). Validating and adapting the Motivated Strategies for Learning Questionnaire (MSLQ) for STEM courses at an HBCU. *AERA Open*, *4*(4), 1-16. https://doi.org/10.1177/2332858418809346

Nagelsmith, L, Bryer, J, & Yan, Z. (2012). Measuring motivation and volition of nursing students in non-traditional learning environments. *Journal of Nursing Measurements*, *20*(2), 90-112. DOI: 10.1891/1061-3749.20.2.90

Nausheen, M. (2016). An adaptation of the Motivated Strategies for Learning Questionnaire (MSLQ) for postgraduate students in Pakistan: Results of an exploratory factor analysis. *Bulletin of Education and Research, 38*(1), 1-16.

Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, *53*(3), 801-813. https://doi.org/10.1177/0013164493053003024

Pintrich, P. R. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). University of Michigan Press.

Pintrich, P.R. & De Groot, E.V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*(1), 33-40. https://doi.org/10.1037/0022-0663.82.1.33

Ramirez-Echeverry, J.J. Garcia-Carrillo, A. & Dussan, F.A.O. (2016). Adaptation and validation of the Motivated Strategies for Learning Questionnaire—MSLQ—in Engineering students in Colombia. *International Journal of Engineering Education*, *32*(4), 1-14. http://www.ijee.ie/contents/c320416.html

R Core Team (2020). *R: A language and environment for statistical computing*. https://www.R-project.org/

Rosseel Y (2012). "Lavaan: An R package for structural equation modeling." *Journal of Statistical Software*, *48*(2), 1–36. https://www.jstatsoft.org/v48/i02/

Saks, K., Leijen, A., Edovald, T., & Oun, K. (2015). Cross-cultural adaptation and psychometric properties of the Estonian version of MSLQ. *Social and Behavioral Sciences*, *191*, 597-604. https://doi.org/10.1016/j.sbspro.2015.04.278

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, *40*(2), 85-94. DOI: 10.1207/s15326985ep4002_3

Smith, S.M. & Chen, C. (2015). MSLQ: Instrument validation of motivation and learning strategies for acquiring computer software application skills. *Issues in Information Systems*, *16*(3), 108-118. https://iacis.org/iis/2015/3_iis_2015_108-118.pdf

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Tong, F., Guo, H., Wang, Z., Min, Y, Guo, W. & Yoon, M. (2020). Examining cross-cultural transferability of self-regulated learning model: An adaptation of the Motivated Strategies for Learning Questionnaire for Chinese adult learners. *Educational Studies*, *46*(4), 422-439. https://doi.org/10.1080/03055698.2019.1590183

Tock, J.L. & Moxley, J.H. (2017). A comprehensive reanalysis of the metacognitive self-regulation scale from the MSLQ. *Metacognition Learning*, *12*, 79-111. DOI 10.1007/s11409-016-9161-y

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Appendix A

MSQL – AF (Final Shortened Version)

The following questions ask about your motivation for and attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, select 7; if a statement is not at all true of

you, select 1. If the statement is more or less true of you, find the number between 1 and 7 that best describe you.

1	2	3	4	5	6	7
Not at all true of me						Very true of me

1.	I try to understand the material in this class by making connections between the readings and the concepts from the lectures.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
2.	I treat the course material as a starting point and try to develop my own ideas about it.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
3.	I try to play around with ideas of my own related to what I am learning in this course.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
4.	Whenever I read or hear a claim or conclusion in this class, I think about possible alternatives.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
5.	I ask the instructor to clarify concepts or instructions I don't understand well.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
6.	I'm confident I have the communication skills necessary to help my classmates improve their work.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
7.	I'm confident I can apply the communication skill I have learned to write a successful assignment for this course.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
8.	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
9.	It is important for me to develop the communication skills taught in this class.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
10.	I am very interested in the communication skills taught in this course.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
11.	I think I will be able to use the communication skills I developed in this course in other courses.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
12.	I think communication skills taught in this class are useful for me to learn.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
13.	When I complete assignments for this class, I set goals for myself in order to direct my activities in each work period.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

14.	I make good use of my time for this course.	*1 2 3 4 5 6 7*
15.	I find it hard to stick to a work schedule for this course. (Reverse code)	*1 2 3 4 5 6 7*
16.	I have a regular place set aside for completing course work.	*1 2 3 4 5 6 7*
17.	I attend class regularly.	*1 2 3 4 5 6 7*
18.	When working on an assignment I make an effort to integrate the feedback provided to me by my classmates.	*1 2 3 4 5 6 7*
19.	I appreciate critical feedback from my classmates because it is an opportunity to learn.	*1 2 3 4 5 6 7*
20.	When my classmates give me feedback on my assignments it helps me understand how my audience is reacting to what I write or say.	*1 2 3 4 5 6 7*
21.	Getting a good grade in this class is the most satisfying thing for me right now.	*1 2 3 4 5 6 7*
22.	When I give a presentation in class I think of the consequences of failing.	*1 2 3 4 5 6 7*
23.	I have an uneasy, upset feeling when I start giving a presentation.	*1 2 3 4 5 6 7*
24.	I feel my heart beating fast when I speak out loud in class.	*1 2 3 4 5 6 7*

Scoring instructions (R):

```{r}
# First ensure that item 15 is reverse coded

data$Q15 <- 8 - data$Q15
```

```
# Each subscale score is computed by taking the mean of their
respective item set


data$Critical_Thinking <-rowMeans(data[c("Q1","Q2","Q3","Q4","Q5")])

data$Self_Confidence <-rowMeans(data[c("Q6","Q7","Q8")])
```

```
data$Motivation <-rowMeans(data[c("Q9","Q10","Q11","Q12")])

data$Planning <-rowMeans(data[c("Q13","Q14","Q15","Q16")])

data$Peer_Learning <-rowMeans(data[c("Q17","Q18","Q19","Q20")])

data$Performance_Anxiety <-rowMeans(data[c("Q21","Q22","Q23","Q24")])
```

```

## Appendix B

MSLQ-AF (Un-shortened Version)

1. In this course, I prefer assignments that really challenge me so I can become a stronger communicator.
2. In this course, I prefer to learn about communication skills through content that arouse my curiosity, even if the contents are sometimes difficult
3. When I have the opportunity in this class, I choose course assignments that will improve my communication skills even if they don't guarantee a good grade.
4. Getting a good grade in this class is the most satisfying thing for me right now.
5. The most important thing for me right now is obtaining a good grade point average, so my main concern in this class is getting a good grade.
6. If I can, I want to get better grades in this class than most of the other students.
7. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
8. It is important for me to develop the communication skills taught in this class.
9. I am very interested in the communication skills taught in this course.
10. I think I will be able to use the communication skills I developed in this course in other courses.
11. I think communication skills taught in this class are useful for me to learn.
12. I like learning about communication skills taught in this class.
13. I like the subject matter of this course.
14. Understanding how to apply the communication skills from this course is very important to me.
15. The communications skills I learn in this course will help me in the workplace.
16. If I revise my written assignments several times, then I will be able to become a stronger writer.
17. It is my own fault if I don't learn the communication skills taught in this course.
18. If I try hard enough, then I will understand and improve my communications skills from this course.
19. If I don't do well on assignments, it is because I didn't try hard enough.
20. My assignments improve when I revise them.
21. I believe I will receive an excellent grade in this class.
22. I'm confident I have the communication skills necessary to help my classmates improve their work.
23. I'm confident I can apply the communication skill I have learned to write a successful assignment for this course
24. I'm confident I can understand the most complex communication skills presented by the instructor in this course.
25. I'm confident I can do an excellent job on the assignments in this course.
26. I expect to do well in this class.
27. I'm certain I can apply the skills being taught in this class.
```

28. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.
29. When I give a presentation in class, I think about how poorly I am doing compared with other students.
30. When I give a presentation in class I think of the consequences of failing.
31. I have an uneasy, upset feeling when I start giving a presentation.
32. I feel my heart beating fast when I speak out loud in class.
33. When I work on assignments for this class, I pull together information from different sources, such as lectures, readings, and discussions.
34. I try to relate ideas or skills in this course to those in other courses whenever possible.
35. When reading for this class, I try to relate the material to what I already know.
36. I write brief summaries of the main ideas from the readings.
37. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.
38. I try to apply ideas from course readings in other class activities such as lecture and discussion.
39. When I complete the readings or assignments for this course, I outline the material to help me organize my thoughts.
40. When I begin an assignment for this course, I go through the readings and my class notes and try to find the most important ideas.
41. I make simple charts, diagrams, or tables to help me organize course concepts.
42. When I prepare for class, I go over my class notes and make an outline of important concepts.
43. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
44. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
45. I treat the course material as a starting point and try to develop my own ideas about it.
46. I try to play around with ideas of my own related to what I am learning in this course.
47. Whenever I read or hear a claim or conclusion in this class, I think about possible alternatives.
48. When I read published research I assume it is correct. **(Reverse code)**
49. When I use a source, I check what other published writers say about it.
50. When other students suggest I make changes to my assignments, I can determine which changes are valuable and which are not.
51. During class time I often miss important points because I'm thinking of other things. **(Reverse code)**
52. When reading for this course, I make up questions to help focus my reading.
53. When I become confused about something I'm reading for this class, I go back and try to figure it out.
54. If course materials are difficult to understand, I change the way I read the material.
55. Before I begin a course reading, I often skim it to see how it is organized.
56. I ask myself questions to make sure I understand the material I have been reading in this class.
57. I try to change the way I learn in order to fit the course requirements and instructor's teaching style.
58. I often find that I have been reading for class but don't know what it was all about. **(Reverse code)**
59. I try to think through assignment feedback and decide what I am supposed to learn from it rather than just reading it over.
60. When completing work in this course I try to determine which concepts I don't understand well.
61. When I complete assignments for this class, I set goals for myself in order to direct my activities in each work period.
62. If I get confused taking notes in class, I make sure I sort it out afterwards.
63. I usually work on assignments in a place where I can concentrate on my course work.
64. I make good use of my time for this course.
65. I find it hard to stick to a work schedule for this course. **(Reverse code)**
66. I have a regular place set aside for completing course work.

67. I make sure I keep up with the weekly readings and assignments for this course.
68. I attend class regularly.
69. I often find that I don't spend very much time on this course because of other activities. **(Reverse code)**
70. I rarely find time to review my sources for credibility and bias when completing assignments for this course. **(Reverse code)**
71. I often feel so lazy or bored when I complete work for this class that I quit before I finish what I planned to do. **(Reverse code)**
72. I work hard to do well in this class even if I don't like what we are doing.
73. When course work is difficult, I give up or only complete the easy parts. **(Reverse code)**
74. Even when course materials are dull and uninteresting, I manage to keep working until I finish.
75. When starting to work on an assignment, I often try to explain it to a classmate or a friend.
76. I try to work with other students from this class to complete the course assignments.
77. When completing work for this course, I often set aside time to discuss the course material with a group of students from the class.
78. When working on an assignment I make an effort to integrate the feedback provided to me by my classmates.
79. I appreciate critical feedback from my classmates because it is an opportunity to learn.
80. Peer assignment workshopping helps me to understand whether I am communicating clearly.
81. When my classmates give me feedback on my assignments it helps me understand how my audience is reacting to what I write or say.
82. When we do peer assignment workshopping in class, I try to offer as much feedback as I can on each essay I read.
83. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone. **(Reverse code)**
84. I ask the instructor to clarify concepts or instructions I don't understand well.
85. When I can't understand the material in this course, I ask another student in this class for help.
86. I try to identify students in this class whom I can ask for help if necessary.
87. As I work on writing assignments, I seek feedback from peers or instructor multiple times.

About the Authors

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