

A Comparison of the Effects of Curriculum Learning Experiences on Problem-Solving Efficacy between the University of Science and the University of Social Sciences and Humanities Students

ABSTRACT: *Problem-solving is a cognitive process. Many studies show that curriculum has a profound effect on student achievement and plays a crucial role in enhancing students' problem-solving efficacy. The primary purpose of the present study investigated students' problem-solving efficacy at Science and Social Sciences and Humanities Universities and conducted to explore how students' problem-solving efficacy at the two universities was affected by their curriculum learning experiences. The study used a questionnaire survey with 312 students from two member universities at Vietnam National University of Ho Chi Minh City. Results of this study described that students' problem-solving efficacy at the both universities was within the range of "average" to "high" response. Curriculum emphasis and learning engagement within two types of institutions indicated positive effect on their problem-solving efficacy.*

KEY WORD: *Curriculum learning experiences, problem-solving efficacy, and Vietnamese university students.*

IKHTISAR: *Pemecahan masalah merupakan proses kognitif. Banyak kajian menunjukkan bahwa kurikulum memiliki pengaruh yang sangat besar pada pencapaian prestasi mahasiswa dan memainkan peran sangat penting dalam meningkatkan kemandirian pemecahan masalah. Tujuan utama kajian ini menyelidiki kemandirian pemecahan masalah di bidang IPA (Ilmu Pengetahuan Alam) dan Ilmu-ilmu Sosial dan Kemanusiaan serta dilaksanakan untuk menyelidiki bagaimana kemandirian pemecahan masalah mahasiswa di kedua bidang dipengaruhi oleh pengalaman belajar kurikulum mereka. Kajian ini menggunakan survey kuesioner dengan 312 mahasiswa dari dua bidang di Universitas Nasional Ho Chi Minh City di Vietnam. Hasil kajian menggambarkan bahwa kemandirian pemecahan masalah mahasiswa di kedua bidang tersebut berada dalam tingkat respon "rata-rata" hingga "tinggi". Penekanan kurikulum dan keterlibatan pembelajaran dalam dua jenis bidang tersebut menunjukkan pengaruh positif pada kemandirian pemecahan masalah.*

KATA KUNCI: *Pengalaman belajar kurikulum, kemandirian pemecahan masalah, dan mahasiswa universitas di Vietnam.*

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INTRODUCTION

Problem-solving is a cognitive process. Problem-solving is such an important efficacy that it focuses on its students becoming effective problem solvers by applying logical, critical, and creative thinking to a range of problems (Wilson, 1993). Problem-solving can provide the site for learning new concepts and for practicing learned skills (Kilpatrick, Swafford & Findell eds., 2001). Educators do not only focus on teaching students what established knowledge to learn, but also teaching students how to think and solve new problems. The development of problem-solving efficacy is, therefore, an important mission for faculty to develop for their students (Pajares & Kranzler, 1995).

Educational systems from elementary schools to professional institutions impart knowledge and teach cognitive skills of which problem-solving efficacy is considered one of the most important (Frederiksen, 1984). The researches of D.V. Pavesic (1991) and also D. Breiter and C. Clements (1996) who are emphasized the importance of problem-solving efficacy as the key focus of future curriculum; and considered as the heart of learning (Schommer-Aikins, Duell & Hutter, 2005). However, some studies recognized that the proportion of Vietnamese students who acquired other skills is very low, mostly under thirty percents (Luong, 2010); graduate unemployment (Oliver, 2002); or 50 percent of graduates from universities (Luong, 2010); and 60 percent of graduates from vocational education and college (Tran, 2009) have to be retrained all around skills or efficacies.

The development and the use of problem-solving efficacy also improve learning. According to A.D. Rossman (1993), when students use problem-solving efficacy, the role of the student changes from a passive recipient of information to a participant in the creation of understanding. Thus, the literature encouraged that the development of problem-solving efficacy are necessary for career success (Gustin, 2001; and Zekeri, 2004). The study of Lone Star College surveyed 450 students for skills or efficacies to your college education that students should possess problem-solving efficacy to survive a tough and efficacy real world (cited in Hamza & Griffith, 2006). Despite the elaboration of the importance of problem-solving efficacy to university students in previously stated research, there has not yet been much research into the problem-solving efficacy of Vietnamese university students.

When students enter university, they are primarily involved in curriculum learning in the class (Baird, 1990). Research recognizes that students who frequently practice active learning perceive themselves gaining knowledge and skills from their higher education and view their university experiences as rewarding (Braxton, Milem & Shullivan, 2000). Although university students acquire knowledge and skills primarily through curriculum learning contributes to university student outcomes (Wu, 2012). As a sequence of learning opportunities, curriculum has several aspects and indications such as plans and intentions, patterns of classroom activities, and textbooks (Schmidt *et al.*, 2001).

University recognizes the importance of creating safe and open classroom environments to foster students learning and development. The curriculum can contribute to valued outcomes of college students (Bowen, 1977; and Chickering & Riesser, 1993). Further, according to L. Braskamp, L. Trauvetter and K. Ward (2006), curriculum is a fundamental component of a college commitment to holistic student development and what and how students learn which are interdependent. Problem-solving efficacy has become the means to rejoin content and application in a learning environment for basic skills and their application in various contexts. Today, there is a strong movement in education to incorporate problem-solving as a key component of the curriculum (Krikley, 2003). In quality assurance terms, the learning outcomes and theoretical knowledge in the curriculum need to be demonstrably connected to practice efficacies, including problem-solving efficacy (Shakespeare & Hutchinson, 2007).

In general, curriculum is a sequence of learning opportunities provided to students in their study and contributes to the development of student's efficacies. Despite the elaboration of the importance of problem-solving efficacy to college students in previously stated research, unfortunately, there is a lack of the literature on college students' problem-solving competence and curriculum learning experiences in Vietnam.

Thus, the primary purpose of the present study was to explore how curriculum learning experiences affect problem-solving efficacy of Vietnamese university students. The results of this study can be useful to administrators and teaching staff in the both universities, and contributes to fill in the literature gap of Vietnamese university student problem-solving efficacy development.

In view of the aforesaid points, this study seeks to address the following questions: (1) How are Science and Social Sciences and Humanities universities students' problem-solving efficacy in general?; and (2) How are Science and Social Sciences and Humanities universities students' problem-solving efficacy affected by their curriculum learning experiences?

METHOD

About the Sample and Instrument. This study was selected random sample of 312 students from two member universities at Vietnam National University of Ho Chi Minh City (VNU-HCM), including 143 students of University of Science (67 female students - 46.9%) and 169 students of University of Social Sciences and Humanities (103 female students - 61%). Participants in this study were third year students who were studying on campus, full time students. According to Y. Huang and S.M. Chang (2004), the third year students are considered the best population for observing student involvement and development at the university.

This study use questionnaire survey to gather data. Structured questionnaire was constructed to provide answers to two research questions generated under introduction such as problem-solving efficacy, student backgrounds,

curriculum emphasis, and learning engagement. The data was analyzed by using rating scale and especially Likert type.

About the Dependent and Independent Variables. The independent variables in this study included three variable blocks: student background, curriculum emphasis, and learning engagement. The first block is student background including gender, class ranking, and family income. The second block is curriculum emphasis including memory emphasis, integration emphasis, and application emphasis. The last block is learning engagement, including overall classroom activity, course work hours, and consulting faculty.

The problem-solving efficacy dependent variable was constructed from five characteristics were: (1) data analysis efficacy; (2) data collecting efficacy; (3) critical thinking efficacy; (4) present solution efficacy; and (5) generate innovation efficacy. As a results shown in table 1, factor analysis revealed that all five competences of dependent variable had factor loading (0.737 – 0.862) greater than threshold level of 0.6; the internal consistency analysis yielded Cronbach's *a* coefficients of 0.867, and cumulative explanation of 65.324% which are significantly higher than the 0.6 (60%) principal guideline and indicating satisfactory reliability for this student competence measurement (Hair *et al.*, 2006). Hence, based on the validation of construct reliability which is concluded that study construct of problem-solving efficacy is reliable.

Table 1

Factor Analysis Result of the Five Elements Constructing Students' Problem-Solving Efficacy in the Study

Variable	Range of scores	Factor loading	Cumulative explanation (%)	Cronbach's <i>a</i>
Data analysis		0.848		
Data collecting		0.779		
Critical thinking	1 – 5	0.809	65.324	0.867
Present solution		0.862		
Generate innovation		0.737		

Note: Data were analyzed with principle component analysis.

About the Data Analysis Method. This study used SPSS 13.0 software to process the data analysis. The statistical methods employed to answer two research questions. Descriptive analysis and analysis of variance (ANOVA) were used to answer the first research question of "How are Science and Social Sciences and Humanities universities students' problem-solving efficacy in general?"; and multiple regression method was used to answer the second research question of "How are Science and Social Sciences and Humanities universities students' problem-solving efficacy affected by their curriculum learning experiences?"

RESULTS AND DISCUSSION

First, the students' problem-solving efficacy at the University of Science and University of Social Sciences and Humanities. The results of table 2 display the means, standard deviations, and ANOVA of students' problem-solving efficacy at two universities and to answer the first research question of this study. As shown in table 2, students' average problem-solving efficacy at University of Science and University of Social Sciences and Humanities was located within the range of the response of "average" (point 3) to "high" (point 4) in the 5-point Likert's scale employed in the questionnaire with mean (M) = 3.35, and standard deviation (SD) = 0.57.

Table 2
Results of Means, Standard Deviations, and ANOVA of Students' Problem-Solving Efficacy among Two Universities

VNU-HCM Members	M	SD	F	$Sig.$
Average of two universities	3.35	0.57		
University of Social Sciences and Humanities	3.45	0.54	9.984	.002
University of Science	3.25	0.59		

For students at the two campuses of VNU-HCM (Vietnam National University Ho Chi Minh), the results of table 2 exhibited that students at the University of Social Sciences and Humanities ($M = 3.45$, $SD = 0.54$) was significant higher than at the University of Science ($M = 3.25$, $SD = 0.59$). The results showed that there existed significant differences of problem-solving efficacy of students among the both universities ($F = 9.984$, $p < 0.01$).

As shown results in table 3, the difference of problem-solving efficacy among male and female students at the University of Science was negligible in general ($M = 3.28$ and 3.20 , $SD = 0.60$ and 0.58 , respectively). The results exhibited that male students' problem-solving efficacy at the University of Social Sciences and Humanities had higher than female students with $M = 3.54$, $SD = 0.52$ and also higher than both male and female students at the University of Science. The results showed that there was no significant differences of male and female students' problem-solving efficacy at the both universities ($F = 2.103$, $p > 0.05$).

Table 3
Means, Standard Deviations, ANOVA Results of Students' Problem-Solving Efficacy among Two Universities and Gender

VNU-HCM Members	Male	Female	F	$Sig.$
	$M (SD)$	$M (SD)$		
University of Social Sciences and Humanities	3.54 (0.52)	3.38 (0.54)	2.103	0.148
University of Science	3.28 (0.60)	3.20 (0.58)		

The results of this study are different from previous studies of MOET (2001), T.L.H. Nguyen (2005), T.J. Vallely and B. Wilkinson (2008), and B. Luong (2010) which showed that Vietnamese college students are weak in problem-solving efficacy. These studies were based on large scale surveys, including public and private universities and even employment. The current study, however, was conducted with students of VNU-HCM – a system of prestigious public universities in Vietnam. The difference between this current study and the previous is probably due to the sample examined in the study is of better students. However, both this study and the previous indicated that the problem-solving efficacy of Vietnamese university students is unsatisfactory. Problem-solving is important for students to become effective problem solvers in their profession (Wilson, 1993; and Hamza & Griffith, 2006) and for later career success (Gustin, 2001; and Froman, 2002).

Thus, Vietnamese government should invest more resources in enhancing problem-solving efficacy of all students in the process of constructing an instructional program. This study compared two different universities at VNU-HCM which basically present different academic disciplines. Unfortunately, there is yet no empirical research done about the relationship between academic disciplines and problem-solving efficacy of students in Vietnam or even in other parts of the world. The results of this study thus can not be compared to results of others. Further research about the relationship between academic disciplines and problem-solving efficacy of students will contribute to fill in the literature gap.

Second, the relationship between students' problem-solving efficacy and curriculum learning experiences at the University of Science and University of Social Sciences and Humanities. At the University of Social Sciences and Humanities, the results of table 4 showed that all three items of student's background of gender ($\beta = 0.139, p < 0.05$), class ranking ($\beta = 0.239, p < 0.01$), and family income ($\beta = 0.198, p < 0.01$), as well as curriculum emphasizing integration ($\beta = 0.250, p < 0.001$) significantly advanced student's problem-solving efficacy ($R^2 = 0.223$). At the University of Science, the results indicated that involvement level of classroom activity ($\beta = 0.199, p < 0.05$) and frequency of approaching faculty for consultations ($\beta = 0.226, p < 0.01$) significantly empowered students' problem-solving efficacy ($R^2 = 0.188$). No other independent variable had significant effect on students' problem-solving efficacy.

For the whole sample, the results of table 4 recognized that the regression model proposed by this study explained 21% of students' problem-solving efficacy at the University of Science and University of Social Sciences and Humanities ($R^2 = 0.188$ and 0.223 , respectively). However, the regression model wielded rather different explanation power for students' problem-solving efficacy among the two types of institutions.

Table 4

Multiple Regression Results of Students' Problem-Solving Efficacy at the University of Social Sciences and Humanities and University of Science

Independent Variables	The Whole Sample	University of Social Sciences and Humanities		University of Science
		Beta (β)		
<i>Student background:</i>				
Gender			.139*	
Class ranking	.125*		.239**	
Family income	.159**		1.98**	
<i>Curriculum emphasis</i>				
Memory emphasis				
Integration emphasis	.141*		.250***	
Application emphasis				
<i>Learning engagement</i>				
Overall classroom activity	.191***			.199*
Course work hours				
Consulting faculty	.126*			.233**
Adjusted R ²	0.210		0.223	0.118

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Students' problem-solving efficacy at the both universities is significantly influenced by their backgrounds and curriculum learning experiences. There are different affecting variables at different universities. Based on these differences, universities should design interventions to enhance students' problem-solving efficacy. As an example, University of Social Sciences and Humanities may very well consider curriculum emphasizing integration; and University of Sciences may develop classroom activity and approaching faculty for consultations.

Integration of the curriculum has described to increase instructional time and to enhance the learning of students (Jacobs, 1990). Further, C. Colvin and P. Ross (1991) suggested that integration of the curriculum can change teaching techniques from the dissemination of isolated facts to a technique to help students construct knowledge. The research of S.T. Bossert (1988) showed that student involvement in class activities promoted student performances. Specifically, recent meta-analyses suggested that student involvement in class activities benefited students at all age levels, of all subject areas, and for a wide range of tasks such as those involving problem-solving efficacy (Johnson, Johnson & Maruyama, 1983; and Slavin, 1983).

In each university, in order to make a policy for the instructional program and to select a teaching method or to evaluate the studying result of the student, the experts or the program makers of VNU-HCM should be notably concerned about this factor. If we must decide a universal intervention to enhance problem-solving efficacy of students across the universities in Vietnam, it might very well be student involvement in class activities.

CONCLUSION

Many studies showed that curriculum has a profound effect on student achievement and plays a crucial role in enhancing students' problem-solving efficacy. This study reveals reliable links between students' problem-solving efficacy and various curriculum learning experiences at the University of Science and University of Social Sciences and Humanities. Results of this study found contribute to fill in the literature gap of Vietnamese university students' problem-solving efficacy development. The study also found that students' problem-solving efficacy at the two types of institutions was within the range of "average" to "high" respond and affected by their background and curriculum learning experiences.

Thus, the information of this study helps administrators, faculty, and scientists at two universities should evaluate their academic learning by the effect on improving students' problem-solving efficacy and to monitor and adjust the strengths and weaknesses of the academic learning to meet the needs of the country. In the process of constructing an instructional program, both universities should design better institutional policies and select advanced academic learning to not only provide background knowledge, but also develop students' efficacy for future jobs.

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