MEDIATION EFFECT OF ACTIVE LEARNING ON THE RELATIONSHIP BETWEEN FACULTIES' FLEXIBILITY AND STUDENTS' INTELLECTUAL DEVELOPMENT IN HIGHER EDUCATION

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ABSTRACT

This study examines the relationship between faculties' flexibility and students' intellectual development with mediating role of students' active learning. The population included all Iranian students at International Branch of Shiraz University. 152 students were selected by random cluster sampling method. The instruments included Student Perception Questionnaire, Intellectual Development Subscale of CSEQ, and Personal Style Inventory (PSI). The instruments were distributed among the students and data was analyzed by software including SPSS v.19 and Lisrel v.8.54. Results showed a significant and positive relationship between dimensions of faculties' rational and intuitional flexibility, students' active learning and intellectual development. According to the results, faculties' rational flexibility has an indirect effect on students' intellectual development via students' active learning. In addition, faculties' institutional flexibility has both direct and indirect effect on students' intellectual development via students' active learning.

Keywords: Active learning; Flexibility; Intellectual development; Teaching style

INTRODUCTION

Student's development depends on teaching quality. Darling-Hammond (2005) states that the ability to maintain quality of classroom teaching lies within individual faculties, giving them a better understanding of how their approach to change may strengthen their ability to make adjustments in their teaching effectiveness. There has been a growing consensus that faculties that want to increase their effectiveness should reflect on their classroom practices and the needs of their students. They could then seek out strategies which would help them add to their teaching "toolbox" or repertoire of techniques, in ways which would meet student needs and positively influence student development. Beaumont (2010) emphasizes that faculty members could implement a higher order thinking sequence of student activities in the academic context, to express their opinions, make inferences from readings, survey others about their thoughts, and eventually synthesize all the information and propose solutions. Campion (2012) asserts that seemingly the context represents the greatest challenge for teachers who transfer to the field from English for general purposes (EGP) to English for academic purposes (EAP).

Flexibility has probably as many meanings as there are people thinking about it (Koppi, Chaloupka, Llewellyn & Fenton-Kerr, 1998). It can be an individual adaptability to new or changing situations; an individual willingness to try new strategies; openness to new ideas and technology; and an appreciation for variety in how people think and behave (Berk, Taber, Gorowara & Poetzl, 2009; Taggart & Taggart–Husladen, 1993; Taylor, 2009; Wonder

& Donovan, 1989), thus, a multifaceted characteristic consisting of both a cognitive and personality component (Duschner, 1987). There are two flexibility styles: Rational or Intuitive. Intuitive-oriented faculties adapt readily to change and tend to match their style of teaching to each student's learning style. On the other hand, rational-oriented faculties tend to be more structured teaching students without giving attention to individual learning style (Taggart & Taggart–Hausladen, 1993).

According to Joyce and Weil (1973), the style used by faculties is very important to the success of the teaching process. They pointed out that faculties should strive to utilize personal flexibility and learn how to employ a wide variety of teaching strategies. Bartz and Miller (1991) noted that not only one style of teaching or method of instruction will work all the time and under every circumstance. Joyce and Weil (1986) elucidated that flexibility in the selection of a teaching method is critical to the learning style of those being served by instruction.

It seems that if faculties put emphasis on behaviours like students' participation in classroom learning, group work, encouragement of creative ideas, and the harmony of faculties and students, they will have a unique role in students' active learning. Based on McKeachie and Svinicki (2011) *active learning* is a catchphrase that is widely being used in the learning approach in which students are encouraged to actively engage with course content. When students are presented with information, there is value in them actively processing that information, and learning by doing can motivate and engage students (Bolliger & Armier, 2013; Machemer & Crawford, 2007).

The focus on learners' active learning in education is not a new idea, and can be traced back to John Dewey at the beginning of the 20th century (Barak, Lipson & Lerman, 2006). Recent pedagogical strategies such as, problem-solving (Mayer, 2004; Toth, Suthers & Lesgold, 2002), discovery learning (Mayer, 2004), small-group discussion and collaborative learning (Barak et al., 2006; Chapman, 2001; Niemi, 2002; Rice-Snow & Fluegeman, 2004), innovating within the classroom environment by incorporating technologies (Barak et al., 2006; Dewey & Meyer, 2000; Oliver-Hoyo, Allen, Hunt & Pitts, 2004), learning-by doing (Schank, Berman & Macppherson, 1999), critical thinking (Barak et al.; Chapman, 2001; Kim, 2009) focusing on scaffolding students' more explicit thinking (Kim, Sharma, Land & Furlong, 2012), students' active engagement in the learning activities (Barak et al., 2006; Bransford, 2004; Finelli, Klinger & Budny, 2001; Mabrouk, 2007; McConnell, Niemi, 2002; Steer, Owens & Knight, 2005) are associated with exemplary efforts of active learning that emphasize learner's active role in their learning.

In regards to the studies of active learning in higher education, many examine the effectiveness of active leaning courses compared to conventional approaches (e.g., McConnell, Steer & Owens, 2005; Terenzini, Cabrera, Colbeck & Parente, 2001) for student learning.

In Figure 1, the conceptual model of this study is presented. As it was mentioned earlier, the primary concern in the current study was to examine the relationship between faculties' flexibility, students' intellectual development and the mediating role of students' active learning. Faculties' flexibility was the independent variable with two dimensions named as: rational (with three sub dimensions: planning, analysis and control) and intuitional (with three sub-dimensions: vision, insight and sharing). Students' development was the dependent variable with six dimensions named as effective writing, effective ideas, technology usage, analytical thinking, relating ideas, and finding information. In addition, students' active learning was the mediator variable with three dimensions named as satisfactory experiences, supportive materials, and active engagement. This article intends to explain the conceptual model of students' intellectual development as illustrated in Figure 1.

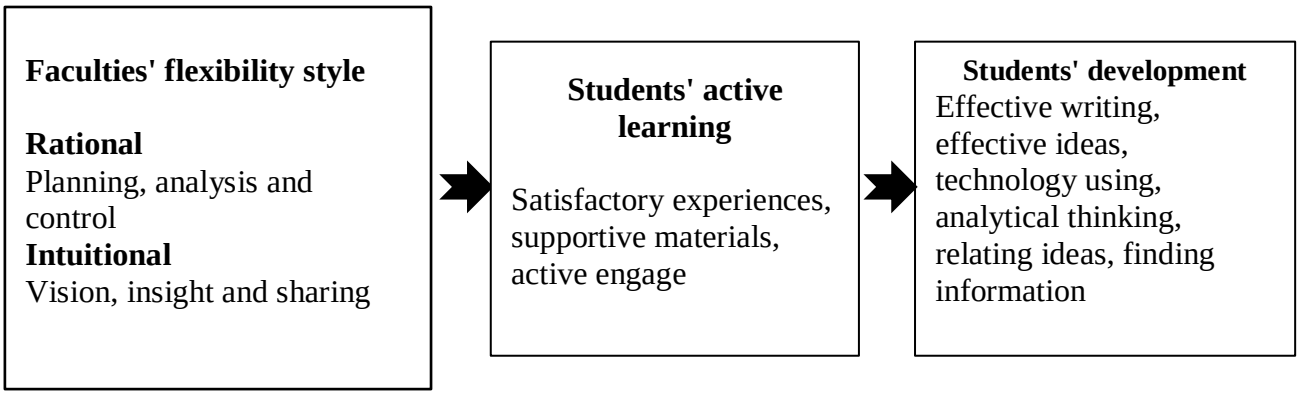

Figure 1: Conceptual model of students' intellectual development

The current research explains the personal and instructional factors of faculties' effectiveness on the intellectual development of students, so it can help faculties and curriculum planners to choose more suitable methods of teaching, relationship and interaction with students and make the highest amount of development in students. The research was conducted at Shiraz University, International Division. Shiraz University is a well reputed institution of higher education in Iran ranked among the top five Iranian universities.

LITERATURE REVIEW

Duschner (1987) integrated two conceptualizations of faculties' flexibility (personality trait and cognitive characteristic) and found how these two types of flexibility relate to each other and further how each relates to teaching. He investigated faculties' flexibility in relation to three different indices of instructional behaviour: 1) overall faculties' effectiveness, 2) specific teaching behaviours, and 3) use of flexible teaching strategies. His findings show very little support for an underlying one-dimensional *faculties' flexibility* construct in either the cognitive or personality domain.

Furthermore, generally weak and inconsistent relationships were found between *faculties' flexibility* and perceived faculties' effectiveness. Perry (1993) found that faculties identified personal flexibility as the main factor influencing individuals' attitudes toward state-mandated collaboration. This was regardless of the age or experience level of the faculties.

Campion (2015) highlighted a range of informal development activities for teachers who attend to the development of their knowledge and combined their knowledge with experience. Culver (1999) investigated the relationship between faculties' flexibility and students' intellectual development in reading and mathematics in third grade students. He found that the mean reading scores of the Intuitive-Oriented faculties' students was higher than those of the Rational-Oriented faculties' students. Moreover, the mean mathematics scores of the Intuitive-Oriented faculties' students were significantly higher than those of the Rational-Oriented faculties' students.

Simon (1997) and Cobb and McClain (2001) found a tension between faculties' attempt to be flexible and reactive to the students' thoughts and needs and his/her propensity actively to manage the students' learning according to his/her plans and purposes.

Leikin and Dinur (2002) focused on a special kind of faculties' flexibility associated with situations in which students' replies are unexpected by the faculties. They found four main patterns of flexibility: (1) different outcomes, (2) different strategies, (3) different sequencing, and (4) different scope, which were used as different faculties' behaviour in the mathematical discussion.

In the literature, the use of active-learning strategies has resulted in mixed effects on students' achievement. Some studies show that active learning can improve students' achievement compared with the traditional, didactic lecture (Albanese & Mitchell, 1993; Ebert-May, Brewer & Allred, 1997; Johnson, Johnson & Smith, 1998), whereas others show no difference at all (Huang & Carroll, 1997; Lord, 1997; Lunsford & Herzog, 1997; Richard & Birge, 1995).

Studies show that a constructivist approach to teaching produces positive outcomes for learning, including achievement (Yager, 1991). Wilke (2003) showed that active-learning strategies resulted in an improvement in students' self-efficacy**.** Furthermore, active learning strategies did lead to an improvement in students' content achievement **(**Wilke, 2003). In addition, the use of active-learning strategies alone is reported to significantly increase or change students' self-efficacy by promoting a belief in their own ability to learn and be successful in it (Allen, Duch & Groh, 1996; Hemenway, Straits, Wilke et al., 2002; Svinicki, 1998; Wilke, 2003). Research also showed that courses incorporating active learning strategies improved student retention, promoted deeper understanding of course materials, and increased students' logical thinking skills (McConnell, Steer & Owens, 2005). Thus, based on this review of the literature, the present study focused on the following objectives:

(1) to determine the relationship between dimensions of faculties' flexibility, students' active learning and their intellectual development
(2) to determine the indirect relationship between faculties' flexibility and students' intellectual development via the mediating role of students' active learning.

Research hypotheses were formulated as follows:
(1) there is a positive significant relationship between dimensions of faculties' flexibility, students' active learning and their intellectual developments
(2) there is an indirect relationship between faculties' flexibility and students' intellectual development via the mediating role of students' active learning.

METHOD

Participants

The population includes all Iranian students at the International Branch of Shiraz University. A sample of 152 students was selected by random cluster sampling method.

Instruments

Three instruments were adopted and used in this study; the *Student Perception Questionnaire*, *Intellectual Development Subscale of College Student Experiences Questionnaire*, and *Personal Style Inventory (PSI*).

The Student Perception Questionnaire

The Student Perception Questionnaire developed by Kim (2009), was used to measure students' active learning. This questionnaire consists of 12 items that utilize a Likert-type 5 point scale with anchored responses on either end of the continuum of , and include overall satisfaction with the course learning environment, including three dimensions: first the course topics, overall course structure, and collaborative class activities; second, students perceived in-class group activities and the learning materials used in the course as supportive in their learning; third, engagement in their learning, students perceived that they were actively engaged in their learning and group activities. Possible responses ranged from complete agreement to complete disagreement. Cronbach's alpha internal consistency reliability

estimate for active learning was 0.64. An item analyses showed the validity coefficient of 0.82 for active learning.

The Intellectual Development Subscale of College Student Experiences Questionnaire (CSEQ)

Intellectual Development Subscale of College Student Experiences Questionnaire developed by Pace and Kuh (2002), was used to measure students' intellectual development. This questionnaire is based on six items that utilize a Likert-type four-point scale with anchored responses on either end of the continuum. Possible responses ranged from a very much to a very little. Cronbach's alpha internal consistency reliability estimate for the students' intellectual development was 0.69. An item analyses showed the validity coefficient of 0.88 for the students' intellectual development.

Personal Style Inventory (PSI)

Personal Style Inventory (PSI) developed by Taggart and Taggart-Hausladen (1993), was used to evaluate faculties' flexibility. This Inventory consists of 30 items that utilize a Likert-type six-point scale with anchored responses on either end of the continuum. Rational style has three dimension including analysis, planning and control and institutive style also has three dimensions including insight, vision and sharing. Possible responses ranged from always to never. Cronbach's alpha internal consistency reliability estimates for the subscales of PSI were 0.65 for rational flexibility, and 0.65 for intuitional flexibility. An item analyses showed the validity coefficient of 0.82 for rational flexibility, and 0.90 for intuitional flexibility.

Data collection, procedure and ethical issues

The instruments were distributed among the participants with necessary instructions and enough information about the study. Each administration required approximately 30 minutes. Cohen, Manion & Morrison (2001) identified two main areas of ethical issues, namely informed consent and confidentiality. Adherence to these principles assisted in building a good relationship between the researcher and the study participants. Knowing that their participation was voluntary and that they had the right to withdraw, further enabled participants to provide informed consent, created a sense of trust and built participants' confidence.

Data analyses

Correlation coefficient was used to test the first hypothesis and the structural equation model for analyzing the second hypothesis.

RESULTS

Descriptive findings

The mean, standard deviation, and correlation of the critical variables, faculties' flexibility (intuitional and rational), students' active learning, and students' development are shown in Table 1. Each of these variables had an approximately normal distribution. 53.9 % of participants were female and 46.1 % were male (N=152). Also of the participants, 33.6 %, 31.6 % and 34.9 % were from humanity, sciences and engineering departments, respectively.

Based on Table 1 there is a positive and significant relationship among sub dimensions of institution style (vision, insight and sharing) with all dimensions of active learning (satisfactory experiences, supportive materials, active engage) and all dimensions of students' development (effective writing, effective ideas, using technology, analytical

thinking, relates ideas, finding information) and all dimensions of active learning (satisfactory experiences, supportive materials, active engage) at the level of .01. Also, there is a positive and significant relationship among all dimensions of active learning and all dimensions of students' development at the level of .01.

Table 1: Descriptive statistics and correlation matrices of model variables

latent	Observed variables	Mean	Std Dv	int1	int2	int3	int4	int5	int6	Exp-satisfy	supmaterial	actengage	planning	analysis	control	vision	insight	sharing
Intellectual Development	**int1**	3.49	0.89	**1**														
	int2	3.34	0.99	.662**	**1**													
	int3	3.38	0.99	.591**	.645**	**1**												
	int4	3.56	0.91	.486**	.495**	.607**	**1**											
	int5	3.38	0.94	.593**	.632**	.682**	.548**	**1**										
	int6	2.69	0.99	.200*	.347**	.377**	.395**	.468**	**1**									
Active Learning	**Exp-satisfy**	3.09	1.01	.536**	.541**	.492**	.452**	.644**	.380**	**1**								
	supmaterial	3.06	0.93	.425**	.478**	.415**	.418**	.563**	.270**	.861**	**1**							
	actengage	3.26	1.07	.452**	.516**	.427**	.434**	.607**	.333**	.878**	.875**	**1**						
Rational	**planning**	3.39	0.50	.223**	.342**	.256**	.291**	.327**	.259**	.274**	.305**	.405**	**1**					
	analysis	3.47	0.60	.296**	.229**	.287**	.207*	.351**	.165*	.467**	.511**	.510**	.450**	**1**				
	control	3.31	0.59	.250**	.258**	.272**	.200*	.314**	.087	.297**	.319**	.322**	.349**	.610**	**1**			
Intitution	**vision**	3.64	0.62	.211**	.321**	.324**	.377**	.395**	.494**	.325**	.274**	.332**	.150	.208*	.079	**1**		
	insight	3.59	0.59	.306**	.354**	.282**	.341**	.400**	.454**	.324**	.289**	.284**	.168*	.257**	.129	.620**	**1**	
	sharing	3.39	0.55	.245**	.292**	.293**	.359**	.338**	.454**	.238**	.220**	.234**	.137	.098	.054	.389**	.418**	**1**

Notes: Significant at: *p < 0.05, **p < 0.01; n = 152

According to the structural equation model for analyzing the mediatory role of students' active learning, the faculties' rational style had no direct effect on students' intellectual development and only by mediating of students' active learning it had positive and significant effect on their intellectual development. Therefore, it can be said that the type of mediatory role of active learning is "indirect only effect". In addition, the faculties' institutive style had positive and significant direct effect on students' intellectual development and also by mediating of students' active learning it had positive effect on their intellectual development. Therefore, the type of mediatory role of active learning is "complementary effect".

Figure 2 illustrates the final model of students' intellectual development based on faculties' flexibility and mediatory of students' active learning.

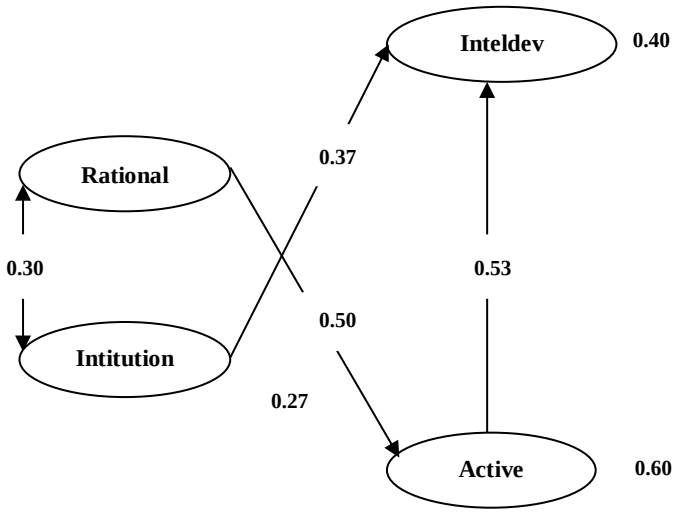

Figure 2: Final model of students' intellectual development based on faculties' flexibility and students' active learning

One step in model estimation was to examine the goodness-of-fit of the hypothesized model in Figure 2. The observed normed x2 was 148.21 (x2/df 148.21:84=1.76) was 0.97, NNFI was 0.96, IFI was 0.97, RFI was 0.93 and RMSEA was 0.07. The results of goodness-of-fit indices exhibited a moderate but acceptance which was smaller than three recommended by Bagozzi and Yi (1988). The GFI was 0.88, AGFI was 0.84, NFI was 0.94, CFI level of overall model fit and, therefore, provided support to the overall validity of the structural model.

For the calculation of the degree of the mediating role of students' active learning, the method and formula of Krull and MacKinnon (1999) and Kenny (2001) is used. In this method the sum of indirect effects are divided by the sum of total direct effects.

$$Mediation = \frac{\sum \alpha\beta}{\sum \alpha\beta + \tau'} \qquad (1)$$

$$Direct\ effect = \tau' \qquad Indirect\ effect = \alpha\beta$$

Figure 3: Formula (1): determining mediation degree

Based on this formula, the mediating role of students' active learning in the relationship between rational dimension and students' intellectual development was 0.98 which represented very strong mediating role of students' active learning in the relationship between these two variables. The mediating role of students' active learning in the relationship between intuitional dimension and students' academic average was 0.30 which represented the partial mediating role of students' active learning in the relationship between these two variables.

DISCUSSION

According to the final model of students' development based on faculties' flexibility and students' active learning, the first sub-hypothesis, a significant relationship between faculties' intuitional flexibility and students' intellectual development, is confirmed consistent with the

study of Darling-Hammond (2005). Some of the major specifications of the intuitional flexibility including group work, focus on imaginative practices, encouragement of new ideas and innovative solutions, and consideration for individual interests in group work which can help to activate students' minds and lead to improve their intellectual development.

The second sub-hypothesis, a significant relationship between faculties' intuitional flexibility and students' active learning is confirmed, too. Because of the aforementioned major specifications of the intuitional flexibility, students can actively participate in their learning process. Furthermore, both intuitional flexibility and active learning put emphasis on the same matter which is students' group work.

The third sub-hypothesis, a significant relationship between faculties' rational flexibility and students' active learning is also confirmed. Some of the major specifications of the rational flexibility include focus on pre-organized pre-planned step by step activities, strict teaching rules and regulations, direct instructions, individual practices rather than group work, details-oriented activities rather than systematic ones. Some students prefer to do practices which are completely pre-organized and so they avoid activities which need to disorganize and reorganize different subjects. Therefore, faculties that are flexible rationally can motivate such students more to participate actively in their learning process. It seems that both kinds of flexibility can improve students' active learning and so inflexible faculties deprive themselves and also their students of such a big profit.

The fourth sub-hypothesis, a significant relationship between students' active learning and their academic averages is confirmed, too, consistent with the study of Albanese and Mitchell (1993); Ebert-May, Brewer and Allred (1997); Johnson, Johnson and Smith (1998); and (McConnell, Steer and Owens (2003). Students' active learning causes them to enjoy class activity and learning class subjects, and largely focus on group work. Therefore, it seems that such characteristics have increased students' academic averages.

The fifth sub-hypothesis, a significant relationship between students' active learning and their intellectual development, is also confirmed consistent with the study of Albanese and Mitchell (1993); Ebert-May, Brewer and Allred (1997); Johnson, Johnson and Smith (1998); McConnell, Steer and Owens, 2003. Predominantly active learning has regard for students' active participation in group class activities. Such activities make students to use their minds' power actively and so have an effect on students' intellectual development and can improve it.

The sixth sub-hypothesis, significant relationship between faculties' rational flexibility and students' academic average is confirmed, and is not consistent with the study of Culver (1999).

According to the aforementioned specifications of rational flexibility, it is easy for students, who are flexible rationally and simply have high scores, to follow the instructions of faculties and increase their academic averages.

Since faculties, that are flexible intuitionally, focus mainly on group work, imaginative practices, contingency between students, new ideas, individual interests, and systematic points of view, it seems these functions cannot directly have an effect on students' academic average. However, when faculties have used some teaching methods and strategies which help to increase students' active learning, the higher students' active learning the higher their academic averages.

In terms of faculties that are flexible rationally, they almost always put emphasis on pre-organized pre-planned step by step activities, strict teaching rules and regulations, direct instructions, individual practices rather than group work, and details-oriented activities rather than systematic ones, it seems these functions cannot directly have an effect on students' intellectual development. However, when faculties have used some teaching methods and

strategies which help to increase students' active learning the higher students' active learning the higher their intellectual development.

CONCLUSION

Generally, the results of the current research showed that flexible faculties had a positive effect on students' development. This feature by participating and activating students in the learning process can lead to their development, directly and indirectly. Accordingly, instructing faculties in styles of flexibility and new teaching methods, on which active roles of students and student-centering are emphasized, can plan the path of training creative intellectual students with high academic achievements.

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