THE EFFECT OF ACTIVE INSTRUCTIONAL METHODOLOGY ON LEARNING STYLES AS MEASURED BY ACHIEVEMENT AND SATISFACTION

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Abstract

Traditional methodology often falls short in terms of keeping students’ attention as well as promoting long-term retention of information. Instructors should play an active role in cultivating students’ active learning in Teacher Training Institute. The purpose of this study was to determine the effect of active instructional methodology on students’ learning styles in terms of achievement and satisfaction. The respondents in this study consisted of 60 students from two groups of students in educational studies. The experimental group was instructed using active instructional methodology such as reflective observation, abstract conceptualization, active experimentation, and concrete experience while the control group was administered a passive or traditional instruction emphasizing only daily lectures with power point presentations. Student achievement was measured using 40 multiple-choice questions. Student Evaluations of Educational Quality (SEEQ) was used to measure satisfaction, and Kolb’s Learning Style Inventory was administered to gather data for learning styles. The results of the study found that there were significant differences in achievement and satisfaction among accommodators in the active instructional methodology group. There was also a significant difference found in satisfaction favoring the active group. Overall findings are expected to serve as a basis for effective instructional methodology in educational studies and as a guide to optimal learning experiences.

Keywords: Active learning, learning styles.

Abstrak

Kajian lampau telah menunjukkan bahawa pengajaran secara tradisional kurang berkesan dari segi mengekalkan fokus pelajar dan ingatan jangka masa panjang. Tenaga pengajar perlu memainkan peranan yang aktif dalam memupuk pembelajaran aktif pelajar di Institut Pendidikan Guru. Penyelidikan ini bertujuan untuk melihat kesan pengajaran aktif terhadap gaya pembelajaran dan hubungannya dengan pencapaian dan kepuasan belajar. Seramai 60 orang responden dari dua kumpulan yang terdiri daripada 30 orang pelajar dalam setiap
kumpulan terlibat dalam penyelidikan pendidikan ini. Kumpulan rawatan diajar menggunakan pelbagai pengalaman pembelajaran yang aktif manakala kumpulan kawalan diajar menggunakan kaedah kuliah dengan persembahan Power Point sahaja. Mereka juga telah menjawab 40 soalan aneka pilihan yang bertujuan untuk menilai pencapaian kognitif dalam kursus. Student Evaluations of Educational Quality (SEEQ) telah digunakan untuk mengukur kepuasan dan Kolb’s Learning Style Inventory telah ditadbir untuk mengutip data bagi gaya pembelajaran. Hasil penyelidikan menunjukkan terdapat perbezaan yang signifikan pencapaian dan kepuasan dalam aspek akomodator melalui pengajaran aktif. Terdapat perbezaan yang signifikan dalam kepuasan belajar di antara kumpulan rawatan dan kumpulan kawalan. Dapatan keseluruhan adalah dijangkakan bagi penyediaan sebagai asas untuk metodologi instruktif yang berkesan dalam pembelajaran pendidikan dan sebagai panduan untuk pengalaman pembelajaran yang optimal.

Kata Kunci: Pembelajaran aktif, gaya pembelajaran.

INTRODUCTION

Background of the Study

The role of instructor in teacher education today is challenging. There has been substantial research that learning process should be active and constructive (Ng, 2010; Thompson, Vermette & Wisniewski, 2004; Balleck, 2006). However learning activities in most courses are examination-oriented, highly structured, restricted code of classroom conduct and have little consideration of students’ active roles in learning (Hoe, 2003). Excellent examination results do not guarantee how successful trainee teachers will become in future in performing their task as a dedicated teacher. As Zimmerman (2002) pointed out one must continue to learn and improve many important skills and knowledge informally and independently. Report from Badrul Hisham and Rosli Sahat (2011) stated many pre-service teachers who have been to school environment failed to maintain and sustain excellence, as they are not independent proactive and self-regulated. According to Ng (2010), the over emphasis of examination-oriented and teacher-centered learning are the causes that lie beneath the program. Instructors should play an active role in cultivating students’ active learning in teacher education colleges.

Reflection on Teaching and Learning

Balleck (2006) reported, “the use of active learning in the form of simulations, student presentations and problem-solving situations will better prepare students to
understand the course content” (p. 1). Active instruction methodology is supposedly effective in fostering understanding and long-term retention so that formal instruction becomes a precursor to life-long learning (Croxton, 2001). According to Croxton, the traditional passive type of instruction by means of verbal and visual reception fail to foster student retention. After two weeks, student can only remember 10% of what they read, 20% of what they hear, 30% of what they see and 50% of what we they and hear. However, with active instruction in which reception, participation and performance are implied, students are able to remember 70% of what they say, for example participating in a discussion or giving a talk; and 90% of what they say and do such as doing a dramatic presentation, simulating the real experience or doing the real thing. The real learning process requires not only recognition but also recall. How quickly students recall knowledge in the long term depends on the amount of time elapsed after the class activities that used to introduce new concepts into practice. Therefore, purposeful learning experiences would be the most effective. The more actively involved student is, the better they will remember what they have been taught.

Problem Statement

Traditional lectures and direct presentations of information during teaching and learning in traditional classrooms and lecture halls often contribute to (a) daydreaming, (b) attending casually to the lecture, (c) listening to iPods, (d) instant messaging on a cell phone, or (e) playing on a laptop computer (Thompson, Vermette & Wisniewski, 2004). As students used to anticipate lecture notes and handouts at the end of a lecture, the proportion of students who engaged active participation in learning has become small. Further, the ubiquitous use of PowerPoint presentations has led students to expect routinely that they will have ready access to these slides. Stanley & Porter (2002) pointed out students’ concentration during a lecture begins to decline after 10-15 minutes. As a conclusion lecture method is a relatively poor instructional approach for maintaining student attention (Bligh, 2000, p. 44).

Although a well planned and well-designed lecture presentation would seem to be time efficient for an instructor to convey large course content, evidence from various sources of information indicates that listening to a classroom lecture is not an effective way to cultivate deep and lasting student learning. As Eisen (2010) pointed, lecturing involves “the transfer of information from the notes of the lecturer to the notes of the student without passing through the minds of either” (p. 2). Convergent experience also revealed that purely verbal presentations using lecturing techniques at large groups of students who passively absorb ideas leave nothing significant or permanent in the student mind (Eisen, 2010). An effective learning requires intense inductive and deductive thinking coupled with personal experience. This argument is comply with Confucius’s aphorism that ‘I hear, and I forget; I see, and I remember; I do, and I understand’ and the belief of Teton
Lakota Indians (2015) that ‘tell me and I'll listen; show me and I'll understand; involve me and I'll learn’.

LITERATURE REVIEW

Introduction

Effective instruction depends on the active participation of the student. Therefore, using a variety of methods so as to involve every student in the learning process is important. This chapter elaborates on research, which support this premise including Learning Theories such as Social Cognitive, Experiential Learning, Constructivism, Cooperative Learning and Learning Styles.

Theoretical Perspective on Active Learning

There are four prominent theoretical perspectives on active learning. They are Social Cognitive Theory, Experiential Learning, Constructivism, and Cooperative Learning. Among these theories, social cognitive theory is the most widely practiced in regards to active learning.

Social Cognitive Theory

Social Cognitive Theory describes learning in terms of the inter-relationship between behavior, environmental factors, and personal factors. Bandura (1997) introduced the concept of reciprocal determinism, where “a person’s behavior is both influenced by and is influencing a person’s personal factors and the environment” (Huit, 2006, p. 4). Multiple factors are taken into account when studying social learning. Bandura (1997) views human functioning as interactions between personal factors and environmental factors. Based on this theory, personal factors includes self-efficacy, self-regulative knowledge and motivational beliefs concerning one’s capabilities to organize and implement their actions during learning activity necessary to attain designated goal and performance level. Environment factor is divided into two categories; the physical context of a learning setting and the social experiences that students have acquired during the learning activity.

Constructivism

From day one people are learning through social interactions (Vygotsky, 1986). Vygotsky described learning as constructivism where students are being embedded within social events and occurring as they interacts with people, objects and events in the environment’ (p. 287)”. In another word Vygotsky describes learning as a process whereby the learner is actively constructs his new ideas and interprets new
concepts based on current and past knowledge or experiences. Vygotsky (1986) used the concept of scaffolding in explaining ‘how’ instructors could help students use ‘what’ they already know to construct to what they need to know. The main argument of this theory is students do not passively receive knowledge but rather actively assimilate it and that students construct new ideas or interpret concepts based upon their current and past knowledge. Based on this argument, instructors should offer an alternative to the traditional, teacher-centered classroom by creating student-centered learning, a number of theoretical variations therefore developed, such as Problem-Based Learning, Discovery Learning, and Participative Learning.

i. Cognitive Constructive Theory

Piagetian theorist proposed that one must actively construct new knowledge according to one’s experiences (Sigelman, 1999). According to Piaget, children are born with a very basic mental structure, which is genetically inherited and evolved. All subsequent learning and knowledge is based on this mental structure. “Knowledge is not simply transmitted from teacher to student, but actively constructed by the mind of the learner (Karai & Resnick, 1996, p.1). To Piaget, cognitive development was a progressive reorganization of mental processes as learners construct an understanding of the world around them, then experience discrepancies between what they already know and what they discover in their environment. Piaget stipulated that students learn through problem solving using two mechanisms; assimilation and accommodation. These mechanisms require an active learner, who should not be passive because problem-solving skills cannot be taught, they must be discovered. Discovery learning is one of the method that student learn best through doing and actively exploring in and outside classroom. In school the classroom-learning environment should be student centered which could be accomplished through active discovery learning. The role of the instructor is to facilitate learning, rather than direct imparting information. They should focus on the process of learning, rather than the end product. Therefore using active methodology of instruction can help student to require rediscovering or reconstructing the truths. Alternative to the active instruction is collaborative learning whereby student can learn from each other; and evaluate the level of the each other’s development. Instructor could design, plan out and assign suitable tasks for student (Karai & Resnick, 1996).

ii. Cooperative Learning Theory

Cooperative Learning theory which is a branch of Constructivism, incorporates the idea that the best learning occurs when students are actively engaged in the learning process and working in collaboration with other students to accomplish a shared goal (Johnson & Johnson, 1999). While constructivism focuses on personal experiences as the foundation for learning new materials, cooperative learning utilizes not only the student’s own experience to reinforce knowledge, but also
utilize the experiences of peers in the classroom to construct knowledge. Both theories emphasize the importance of cooperative interaction in planning and implementation of instruction. Cooperative learning theory is similar to constructivism, which is focusing on student-centered education. Instead of teacher-centered instruction, sitting in a lecture or reading text, students are given a task or assign a problem and are asked to propose possible ways as a solution on their own and with the help of others. During instruction the teacher facilitates students to the source of the information and direct them to think that they may require rather than disseminating information directly. In contrast to traditional teaching methods where students are perceived to be empty vessels awaiting the teachers’ knowledge, cooperative-learning structures recognizes the importance of the student’s existing knowledge and puts that knowledge to work.

**Objectives of the Study**

There are four objectives to justify this research. Firstly this research aims to study if students’ learning styles in achievement are affected by active instructional methodology. Secondly, this research aims to study if students’ learning styles in satisfaction are affected by active instructional methodology. Thirdly, this research aims to find out if students’ achievements differ when using active instructional methodology rather than passive instructional methodology. The fourth objective is to justify if students’ satisfaction differ when using active instructional methodology rather than passive instructional methodology.

**Research Questions**

The following questions are addressed in this study:

1. Does students’ achievement differ when using active instructional methodology rather than passive instructional methodology?
2. Does students’ satisfaction differ when using active instructional methodology rather than passive instructional methodology?
3. Does the performance of accommodators, assimilators, convergers, and divergers differ between active instructional methodology and passive instructional methodology in achievement?
4. Does the performance of accommodators, assimilators, convergers, and divergers differ between active instructional methodology and passive instructional methodology in satisfaction?

**Significance and Contributions of the Study**

Piagetian theorists proposed that one must actively construct new knowledge according to one’s experiences (Sigelman, 1999). According to Ng (2010) “students are hypothesized to function as ‘scientists’ who actively construct
theories to self-regulate their own learning” (p.16). This study is significant as it expands the research on active instructional methodology in teacher training institutes by emphasizing participants’ learning as the key criterion. Educators can find ways of implementing active instruction in order to improve the achievement and satisfaction among students in teacher education institutes.

RESEARCH METHODOLOGY

Sample size and data collection

This study employed a post-test only control-group experimental design. The quasi-experimental research design is appropriate when the researcher have two groups of participants that could not be divided or separated (Creswell, 2009). This design aimed to determine the relationship between active instructional methodology and its effects on students’ achievement and satisfaction. 60 students were assigning into experimental group and control group according to their class. The intervention of 15 weeks was given only to the experimental group, and a post-test was given to both groups.

Instruments and variables Used

The Kolb Learning Styles Inventory was utilized to classify respondents into learning styles that could be classified into diverger, converger, assimilator, and accommodator. Kayes (2005) credited the Kolb LSI with strong reliability. The test-retest reliability for the LSI ranged from 0.93 to 0.99. The internal consistency for the inventory ranged from 0.53 on the active scale to 0.74 on the abstract scale. Students’ Evaluation of Educational Quality (SEEQ) was employed to measure students’ satisfaction. The overall reliability for the SEEQ questionnaire was 0.94. It consists of 9 distinct components with 41 items. The construct validity also has been established with coefficient alphas between 0.88 and 0.97 (Corbalan, Plaza, & Hervas, 2013). Students’ satisfaction was gathered from a five point Likert scale, (1 = very poor to 5 = very good). Low mean score means a lower level of satisfaction to the instruction. The level of measurement assumed to be interval for both dependent variables. The dependent variable - achievement was measured using End of Semester Evaluation, which consists of 40 multiple-choice questions. In order to ensure the degree to which the assessment measures what it appears to be measured, all questions were constructed based on test specification table providing both content and face validity.

Scoring of Kolb LSI involved adding columnar items to obtain scores in four areas. Concrete Experience (CE) was calculated by adding the entire ranking for items in column 1, except for items 6 and 9. Reflective observation (RO) resulted from adding all items in column 2, except for items 3 and 8. Abstract conceptualization
(AC) were calculated by adding all items in column 3, except for items 6 and 7 and active experimentation (AE) were calculated for items added in column 4 except for items 3 and 9. Based on the existence of a negative correlation between AC with CE, and AE with RO, the four learning orientations are then utilize to calculate the combination scores measuring the abstract / concrete dimension (AE-CE) and the active/ reflective dimension (AE-RO). The subjects’ learning styles was then be categorize as converger, diverger, assimilator or accommodator based on the plotting of these two combination scores.

The collected data was analyzed using SPSS version 17. Mann-Whitney U Test was conducted to evaluate if there was a significant difference between the active and passive groups for each of the learning style in terms of achievement and satisfaction. One-way ANOVA was conducted to look at the within-group interaction for following factors: (a) instructional methodology (active and passive), and (b) learning styles (four learning styles as measured by Kolb LSI). T-test was used to compare mean score for achievement, and be statistically test the dependent variable of satisfaction between both groups.

**RESULTS**

Table 1 indicated that there was no significant difference for achievement between the active group and passive group samples using *t*-test at the .05 level of significance $t(58) = -.751, p = .455$.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
<th>Mean Difference</th>
</tr>
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<tbody>
<tr>
<td>Equal variances</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Assumed</td>
<td>-.75</td>
<td>58.00</td>
<td>.455</td>
<td>-.567</td>
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<tr>
<td>Equal variances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Assumed</td>
<td>-.75</td>
<td>57.96</td>
<td>.455</td>
<td>-.567</td>
</tr>
</tbody>
</table>

$p < .05$

Table 2 revealed that there was a significant difference on satisfaction between active and passive instruction methodology using *t*-test at the .05 level of significance $t(58) = 5.57, p = .000$. 

95
Table 2
*T-test results for Satisfaction: Mean Comparison (t-Test) for Satisfaction by Instructional Methodology*

<table>
<thead>
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<th></th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances Assumed</td>
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<td>58.00</td>
<td>.000</td>
<td>.36</td>
</tr>
<tr>
<td>Equal variances Not Assumed</td>
<td>5.57</td>
<td>55.26</td>
<td>.000</td>
<td>.35</td>
</tr>
</tbody>
</table>

$p < .05$

Mann-Whitney $U$ test was conducted to evaluate the differences of each learning styles between active and passive instructional methodology group on achievement and satisfaction. In Table 3, accommodators scored significantly higher in active instructional methodology on achievement at level of significance $p < .05$. Accommodators and convergers scored significantly higher on satisfaction.

Table 3
*Mann-Whitney U results (Level of significance)*

<table>
<thead>
<tr>
<th></th>
<th>Achievement</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodator</td>
<td>.002</td>
<td>.004</td>
</tr>
<tr>
<td>Assimilator</td>
<td>.002#</td>
<td>.309</td>
</tr>
<tr>
<td>Converger</td>
<td>.592</td>
<td>.028</td>
</tr>
<tr>
<td>Diverger</td>
<td>.823</td>
<td>.057</td>
</tr>
</tbody>
</table>

P<.05

#Reverse scoring

**DISCUSSIONS AND CONCLUSION**

**Research Question 1**

The between group results of the present study indicated that there was no significant difference between active versus passive instructional methodology in achievement. Overall the results could be interpreted as conforming the views expressed by McKeachie (1995) who stated that as long as the goal is the transmission and acquisition of information, lecture method is as good as the other instructional methodology. These results supported some of those found in the literature (Allinson & Hayes, 1988). One explanation for this outcome is that Kolb
(2005b) recommended that all learners experience the experiential learning cycle rather than be matched with one specific method. Another reason for this result could be the learner’s ability to adapt to both environments, especially memorizing the contents for final examination. As McKeachie (1995) posited, regardless of students’ preferred learning style, they can learn strategies that allow them to be successful with any method of teaching.

Steward-Wingfield and Black (2005) found that in terms of short term versus long-term retention, the result are mixed. Because the current study lasted for 15 weeks, it was similar to research that measured delayed recall. For delayed recall, most of the research favors discussion or lecture combined with discussion. Steward-Wingfield and Black (2005) stated that recalling information favors lecture. As the difficulty of the knowledge increases, discussion may be more effective. The better achievement found in the passive instructional methodology group might have been related to the time spent on teaching for the test. In the passive group instructors may have been taught for test. In comparison, the active group had fewer opportunities to focus on examinations because the nature of the instruction was being varied.

**Research Question 2**

As for the dependent variable of satisfaction, this study employed the use of two instructional methodologies designed to experiment active learning on student satisfaction with the entire course. The overall results were positive with the great majority of students in active group affirming their appreciation of the active approaches. Although there was no significant difference in achievement in both group however, it showed a significant difference in satisfaction. The results supported the notion that students preferred the use of a variety of active instructional methodology when compared to more passive learning methods. Students’ satisfaction with the course taught with these methodologies is apparent. According to the self-report data from the students, there is evidence that learning took place in the course. Nearly all the students in the active group preferred the use of group or peer learning, reporting lessened anxiety and more comfort similar to the findings of Zimbardo, Butler and Wolfe (2003). It also functioned well as a cooperative learning activity and thus serves to add support to the body of research in cooperative learning. These activities are known to be effective; yet they are uncommonly used (Thompson and Vermette as cited in Thompson, 2004). These findings provided additional strength regarding transfer of learning over the long term.

**Research Question 3**

The results largely confirm the research hypothesis as the accommodators in experimenting active learning have greater success in improving and retaining
course content. The comparative study of the groups establishes that the experimental group retain knowledge in the long term better than the group which has been receiving traditional teaching, thus confirming that “when students interact with other students, having to explain and discuss other perspectives, this leads to greater understanding of the material to be learned” (Abu & Flowers, 1997, p. 2). The results also confirmed with Rosetti and Nembhard’s (1998) opinion that the structure of cooperative learning has motivated the accommodators in their interest to learn and this structure has helped accommodators in their knowledge retention as well as encouraging students to participate in class discussion. In this experiment, this has also implied repetition of ideas, concepts and structures through reading, writing, listening, speaking, and simulating the real experience of being a beginning teacher which have a positive effect on knowledge retention.

However, assimilators are found to be in opposite direction compared to accommodators. They have a higher score in passive instructional methodology. This finding was in-line with Diaz (1999) who found that passive instruction led to a better achievement. It may due to the characteristics of abstract conceptualization and reflective observation as their dominant learning abilities. These students are motivated to answer the question what is there to know. They like accurate, organized delivery of information and they tend to respect the knowledge of the expert. They aren't that comfortable randomly exploring a system and they like to get the right answer to the problem. This characteristic makes them to perform better in passive instructional group. This study conformed to Byno (2008) that assimilators prefer to watch than to act. They learn better through lectures and readings. People with this learning style are best at understanding a wide range of information and putting it into concise, logical form. Individuals with an assimilating style are less focused on people and more interested in ideas and abstract concepts. Generally, people with this style find it more important that a theory have logical soundness than practical value. In formal learning situations, people with this style prefer readings, lectures, and having time to think things through (Byno, 2008).

**Research Question 4**

Findings revealed that there is a significant difference in satisfaction among accommodators between both instructional methodologies. This is conforming to the report of Kolb (2005) that doing and experimenting motivate accommodators. According to Kolb, accommodators would look for concrete experience, being practical rather than theoretical, they reflects the fit between active learning as a learning tool and adopted it as their learning style. Accommodators look for significance in the learning experience and consider what they can do, as well as what others have done previously. These learners are satisfied working with complexity and are able to see relationships among aspects of a system (Kolb, 2005a). According to Kolb, anything that encourages independent discovery is
probably the most desirable among accommodators. Therefore they gain satisfaction to be an active participant in this study.

For convergers, although there is no significant difference in long-term retention, the result indicated a significant difference among convergers in satisfaction between active instructional methodology and passive instructional methodology. According to Kolb (2005a) convergers have abstract conceptualization and active experimentation as dominant learning abilities. This modality makes them to rate a higher satisfaction in active instructional methodology. Convergers are the ‘how’ learners. They think about things and then try them out. They derive their satisfaction from learn through interaction with peers. Students with this learning style are best at finding practical uses for ideas and theories. Empirically they have the ability to solve problems and make decisions based on finding solutions to questions or problems in problem based learning and cooperative learning environment. This converging learning style students is in-line with Byno (2008) who found that in formal learning situations, students with this style prefer to experiment with new ideas, simulations, laboratory assignments, and practical applications (Byno, 2008).

Conclusion

At the end of the study, the researcher was able to make several conclusions regarding the implication of active instructional methodology to students’ learning. Firstly, accommodators are more satisfied learning in active instructional methodology settings and they also scored higher in the evaluation. Secondly, most of the students from active instructional group enjoyed more towards the course. Students in active group express their satisfaction towards the instruction in the form of rating in satisfaction inventory. If most of the students are found to be accommodator, active instructional methodology should be better in facilitating students in the class. Thirdly, active instructional methodology performed well in the classroom environment, provided strong evidence for educators to meet the learning needs of most students. Instructors need to integrate strategies in their expressions and pedagogical orientation if they were to become more effective in their practice.

Recommendations for Further Research

Further research could involve a factorial research design (Creswell, 2009) that uses three methods of instruction: active, passive and a combination of two, to investigate its relationship on four learning styles. This would address a notion that each method has its advantages on different learners. Next, future research could look into the interaction effect. Perhaps there is an interaction effect between both instructional methodologies with achievement and satisfaction. In terms of dependent variable, further research could measure long-term as well as short-term
retention application of course information. In addition, researcher might consider implementing a pre-test and post-test to evaluate changes in students’ experiences throughout the semester.

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