

Learning Framework Improvement for Developing Individual Difference

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Abstract: The competence of the student learning process in Senior Air Officer College (SAOC) using the Kolb's learning styles promoting learning differences both instructors and students is presented, where the use of negative reinforcement was implemented. Kolb's instructional techniques with adult learning and constructivist learning design are needed to improve to obtain more effective in the learning process. Reflective learning was used to evaluate student learning outcomes. We found that it is not only instruction tool suitable for student learning style in SAOC learning framework but it is also matched the instructors' and students' learning styles, which can increase more in the students' learning performance. This work is extended from our work that we have considered the relationship between the instructors' learning style, instructors' facilitator styles and students' learning style, the high learning achievement is obtained, which is discussed in detail.

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1. Introduction

The re-organization and new policy relating to the organizational development were introduced in the Royal Thai Air Force (RTAF) under the command in chief in 2012. The aim is to become professional military based organization. In other words, this is to develop the competency of air personnel, and consequently allow them to perform their functions professionally. One of the key drivers was the implementation of the Knowledge Management System (KMS), which could assist in the improvement of the task effectiveness and the learning efficiency. This responsibility to develop the air personnel into professional military is on the Directorate of Education and Training of the RTAF. In fact, there are many institutions under the Directorate of Education and Training of the RTAF ranging from primary to higher education. Currently, there are 4 institutions operating at the level of higher education under the RTAF. These include the Squadron Officer School (SOS), the Senior Air Officer College (SAOC), the Air Command and Staff College (ACSC) and the Air War College (AWC). Each of the 4 higher education institutions has their specific objective. SAOC is one of Professional Military Education. Its mission is the training of executive and basic staff function which is essential for the division level. The qualified students are a variety of ages, from 38 to 54. In addition, their basic education ranges from undergraduate to Ph.D. On the whole, they are military personnel, ranking from Squadron Leader to Wing Commander, participating in peace support operations (or PS's) in various areas of

the RTAF. The combined factors cause to main problems which minimize their learning achievement.

Generally, learning activity can be divided into 2 categories, where the first one is the individual study where are purposefully provided to foster the development of individual student initiative, self-reliance, and self-improvement. The last one is the group study where students interact with each other to acquire and practice the elements of a subject matter and to meet common learning goals. It is a very formal way of structuring activities in a learning environment that includes specific elements intended to increase the potential for rich and deep learning by the participants. As mentioned in the previous paragraph, due to the differences in the student's qualification, it is accepted that it is almost impossible to design the learning activity and process that suits each student individually and support their various levels. This paper focuses on the development of an alternative learning framework for the SAOC to accommodate the individual differences of the military officers. One extreme group is the older generation of military officers who possess a lot of experiences but less qualified in terms of educational degree. This group is capable of applying experiences and sharing knowledge to others when there are opportunities to share ideas. The other extreme group is the new and younger generation of military officers who receives good educational background but less experience to apply their information from the educational years to solve real problems when facing with difficulties. Instead of fitting students to the existing learning framework and

focusing on the obvious (e.g. educational background), the approach presented in this paper applies the knowledge management concept to accommodate the differences to maximize student's accomplishment (Vonkdarunee, 2012). This alternative learning framework is the new learning process in the learning preparation. It is used suitably for individual differences by setting the group learning. The new group learning is special. It is not the same as ordinary group learning because it is set by considering the student learning style according to student role in term of leader. Apart from this, the exercise is also arranged properly to the student's learning style which is the older generation in order to share their experience and knowledge to each other. It is going to lead to the high learning outcome.

The instructor should pay attention to the learning style of the students when preparing the teach activities. The teacher needs to know the students very well in order to select the most suitable learning strategy according to each situation (Senemoglu, 2001). Matching and mismatching of styles may also have an indirect impact on the learning outcomes. Many researches are interested in matching between the teaching style of the instructor and the learning style of the student (Dede, 2009). As mentioned earlier, students attending the SAOC come from various backgrounds which present the SAOC with the problem of the individual differences. These individual differences could also result in many different learning styles of students within a group. Hence, it is difficult for the instructor to adapt his/her teaching approach that suits each student within this same group. It is believed that the teaching style of the instructor is the reflection of the learning experiences the instructor had in the early years of his educational background. Hence, the instructor is effective and comfortable with the teach style that matches well with his learning experiences. This alternative learning framework is not investigated on the influences of the matching and mismatching of learning style between the instructors and students, but also explore each learning style of the instructor influence the facilitator styles and which facilitators' style is suitable for the accommodator student learning style and makes the students learning achievement

2. Background

The field of adult learning was pioneered, which is stated that adults are motivated to learn from being in situations in which they see a need to learn. Moreover, adults are oriented to the broad range of affairs in life, not to narrow subjects. Thus, adult teaching should be multidisciplinary rather than subject-oriented. Since adults learn from their experience, the most productive adult learning comes from the analysis of adult experience. (M.K. Smith,

2002). Sandra Cornett (1981) reviewed "Teaching the Elderly" that intellectual ability does not decline with aging, it only changes. The intelligence that we absorb during our lives such as vocabulary, reasoning and ability to evaluate past experiences increases with age. The older person learns faster than the younger person if learning requires information acquired in the past. Exploring past experiences, using concrete examples and asking patients what they want to learn builds on this ability. Like, the various age of RTAF students, adult learning can be focus on the application of the framework to support their achievement. It is said that the instructors add the new information on their foundation of interests and understanding already in place. For this reason, the teacher needs to know the class's students very well and know which learning strategy they use in which situation (Dede, 2009). According to Grasha & Grasha (1996), the teaching style can be divided into four areas as follows, where more details can be found in the literature, where they are (i) Formal Authority - the Formal Authority approach focuses on content and can be very instructor-centered, (ii) Demonstrator - this approach concentrates on the performance of an academic procedure, (iii) Delegator - teachers who practice a delegator teaching style tend to place control and responsibility for learning on individuals or groups of students and (iv) Facilitator - teachers who have a facilitator model teaching style tend to focus on activities. However, there is other type of facilitator style, authoritarian democratic and *laissez-faire*. (Conseil De L' Education Medical DU Quebec, 2014). It is found that the all three of facilitator styles differentiate teacher approaching in facilitating situations such as organization of meeting, choice of objective, choice of procedures, group relations, participation and evaluation, where the details are given in the followings.

Authoritarian; when organize the meeting, he arranges everything without discussion, presents the objective to the group, follows it without fail; if disagreement, imposes his approach. He informs the group about the procedures and prohibits any deviation. For the group relations, group members focus on the facilitator which is one-way communication. In group participation, the facilitator directs everything. There is no sense of initiative created. The facilitator avoids the evaluation because he doesn't want his role and attitudes questioned.

Democratic; when organize the meeting, he arranges some things and discusses potential improvements, asks group to review objective and helps it make an informed decision. He proposes a range of procedures and solicits others. He helps the group make a choice and maintains that choice. For group relation, multiple-channel communications

come from the facilitator to members and among members. The climate is full of trusty. Both facilitator and members play their roles, with each having their job and responsibilities in participation. The evaluation is important since it helps him improve.

Laissez-faire; when organize the meeting, he arranges nothing except venue, provides a general overview of the objective and then lets the group do what it wants. He do not have defined procedure, group leaders choose their own procedures. For group relation, clans are formed, some members isolated, meeting gets bogged down. With the facilitator's laissez faire attitude, some members take control while others remain passive in participation. He doesn't think about the evaluation.

Instructional style is a product of many factors. These include, for examples, the personality type, the preferred learning style, the social interaction theory, and the instructional theory (Rowley, Miller, and Carlson, 1997). It is explained in the Indiana University Teaching Handbook that it is important to remember that everyone tends to teach in the style in which they learn best. An instructor who has studied with a great lecturer may feel lecturing is the only way to teach. However, this might not be the best instructional style for all students. Be aware that individuals vary greatly in their learning styles, and your goal is to take them from wherever they are to the next level of development. It is recommended that the most appropriate way is to learn to teach the students you have rather than the students you want to have. Furthermore, students can succeed when their learning needs are addressed. Similar to other fields, there is no one solution that fits all. Hence, it is best to try to include activities that allow students to learn in a variety of modes. The more active involvement students have in the learning process (through discussions, question and answer sessions, group projects, problem sets, presentations, etc.), the more information they will retain and the more enjoyable they will find their learning experience in class. In general, considerable evidence indicates that teaching techniques that maximize interaction between students and teachers (and among students themselves) tend to emphasize cognitive tasks at the higher levels of Bloom's taxonomy of learning objectives. The ways in which the instructor's objectives are carried out will either facilitate or hinder what the instructor is trying to accomplish with students. This is why it is important to "fit" the teaching style to both the course objectives and to the students' varied learning styles. The most success of adult leaning comes from their experience. So, instructor approach which is suitable for varied adult learning style must be group learning approach because the students will have an opportunity to share their knowledge. It is believed that the group

learning approach, including both teaching and learning in group, plays an important, valuable role in the all round education of students (Gunn V, 2007). This is not the case in the current SAOC situation where educational backgrounds are varied greatly and cover wide range of ages, where he said that, in general, group learning can be divided under three broad headings. These include content, task and processes. Hence, in SAOC case, the group learning approach is still applied, but with alternative learning process based on constructive learning suitable for the SAOC characteristics. It is said that individual differences moderate the way the individual responds to various situations in different aspects of organizational practices. John F. Glass (1999) concluded in his research that the objective of the higher education is the generation or creation of new knowledge. The most effective approach would be to adopt a constructivist and an inclusive philosophy, which then allows us complete freedom in approaching any system in order to facilitate the development of the full range of individual differences. This is also supported by Thompson (2008) that individual differences are psychological traits or chronic tendencies that "convey a sense of consistency, internal causality and personal distinctiveness". Individual differences may affect behavior only when paired with conditions that induce stress (i.e.a stress diathesis or interaction model.)

The team roles assumed by individuals also influent the effects of individual differences. Stewart, et al. (2005) proposed such a model in which the relationship between the individual difference and the team outcome is affected by team roles. Individual difference in cognitive processing is one such factor that is cited as relevant to effective operations of teams. Hence, the alternative learning framework of the SAOC presented in this paper is designed such that it applies the concept of constructivism in learning process. Particularly, the problem solving is utilized in the group learning in order to motivate and generate new knowledge in the learning process and increase the learning outcome. Reinforcement processes were seen as primary in the shaping of behaviour. To be clear, while Positive Reinforcement is the strengthening of behaviour by the application of some event, Negative Reinforcement is the strengthening of behaviour by the removal or avoidance of some aversive event. Positive and Negative Reinforcement are the approaching machine that all instructors need to understand how they may influence students behavior (Skinner, 1968). This is sometimes considered two sides of the same coin since they may influence the behavior by using positive and negative reinforcement (Kohn, 1933, p.50). The negative Reinforcement should be immediate when applicable,

and instructors should inform the students to reason for it (Rascoe and Atwater, 2005). Jonathan Cohen (2005) concluded the result of positive and negative reinforcement that they affect the student motivation and achievement. Brimmer, 1982, p.59 said that students will apparently respond favorably to either positive or negative reinforcement and what seems to be important is that attention of some kind is paid to student attempts there was no difference between the students improved level of achievement. This study indicates that students will respond favorably to any reinforcement as long as attention is given to student attempts. Seeing the qualification of negative reinforcement, the elderly students are chosen to be a leader of each group. This is to prove that there are advantages in negative reinforcement. It depended on how you can pull out any side of it.

Dewey (1933) defined reflective thought as “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and further conclusions to which it tends. (Ksenija Napan, and Sylila Monteiro, 2004) This theory is mostly connected to perceiving reflection as part of a cycle of learning (Kolb, 1984). Reflection in terms of learning “is a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations” (Boud, Keogh and Walker, 1985, p.7). The concept of reflective practice introduced by Donald Schon (1983, 1987) is the cultivation of the capability to reflect in action whilst doing something, and to reflect on action – after it has been done. Journal writing is an intentional reflective design strategy that has been used in traditional (face to face) learning environments to facilitate the integration of new dimensions. “Meaning making, according to constructivists, is the goal of learning processes; it requires articulation and reflection on what we know” (Jonassen et al., 1995, p.11). Individual reflection is an important strategy that may enhance the development of insight, heighten cognitive awareness, promote critical thinking, and engender personal transformation (Andrusyszyn & Davie, 1995). Bain et al.’s (1999) ‘Five Point Reflection Scale’ (Table IV p 60) is very detailed, and was discussed at length with the students before first Reflective Journal submission. Each level represents a degree in complexity from reporting, responding, reasoning and reconstructing.

The five point reflection scale has been used in SAOC framework as an effective tool to evaluate the individual reflection through interactive journal writing of SAOC students. That reflective action extends learning in terms of depth, and the personal learning process is stimulated through dialogue during interaction in team. In 2008, experiential Learning

theory was reviewed by Alice Y. Kolb and David A. Kolb. The concept of learning style is used to describe the individual differences in learning based on the learner’s preference for employing different phases of the learning cycle. The Kolb learning style model was developed, and it was based on Kolb’s experiential learning theory. In this model, Kolb defines the learning style on a two-dimensional scale based on how a person perceives and processes information. How a person perceives information is classified as concrete experience or abstract conceptualization, and how the person processes information is classified as active experimentation or reflective observation. Accordingly, Kolb (1985) describes the process of experiential learning as a four-stage cycle involving four adaptive learning modes as shown in the Figure 1.

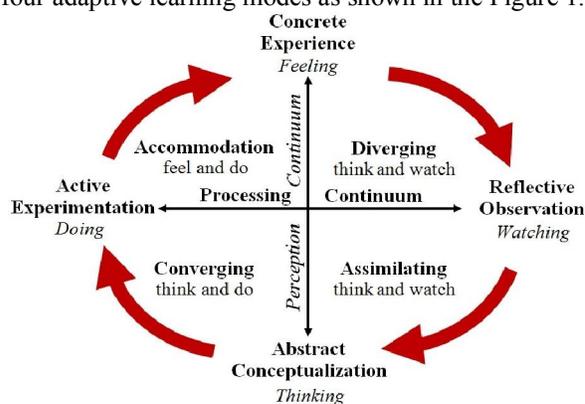


Figure 1: The Kolb Learning Style Model

Figure 1 illustrates the Kolb learning style model which can be seen as the four stage cycle. The converging prefers dealing with objects, rather than people, and is often considered unemotional. They are strong in practical application of ideas, can focus on hypo-deductive reasoning on specific problems, and are believed to have narrow interests. Diverging is good at generating ideas, which tends to be more “people oriented”, and are usually more emotional. They are strong in imaginative ability, good at seeing things from different perspectives, and are believed to have broad cultural interests. The assimilators are strong with the creating theoretical models with the inductive reason. Accommodators grasp experience through concrete experience and transform their experience through active experimentation. They are intuitive and often become impatient when a problem does not conform to their ideas. Their greatest strength is doing things. They are more of a risk taker, and they perform well when required to react to immediate circumstances. Christopher Kayes (2005) suggested in his critical review that learning style inventory remains one of the most influential and widely distributed instruments used to measure individual learning preference. Moreover, Peter Smith and Jennifer Dalton

(2005) found that teachers have developed a range of personal methods of identifying individual and group learning styles and a range of techniques to respond to them. Their methods are interactive and usually suggested by observations of learners' reactions rather than by applications of particular learning theories.

Besides the student learning style, this study also aims to give importance to the teacher learning style. In "Methods of the Teaching and Goals of Teaching: Teaching Styles of Teachers in Higher Institutions" by Maizam Alias (2008), it is stated that teaching style is something that concerns the process of teaching rather than the content of teaching (Neher, Gordon, Meyer and Steven, 1992). Irby (1995) refers to teaching style as the manner, method, or means by which teachers attempt to convey information and influence the understanding and behavior of their learners. Intuitively, teaching style thus appears to be one of the major contributors to students learning (i.e. the effectiveness of teaching). Learning theory also supports the idea that teaching style influences teaching effectiveness as suggested by the cognitive learning theory (Boger-Mehall, 2007). Empirically, matching and mismatching of teaching and learning styles was found to have direct and indirect effects on learning outcomes (Ford and Chen, 2001). However, the effects observed were dependent on the maturity of learners. The need for matching teaching and learning style appear to be more prominent among developmental students when compared to the highly motivated mature learners. It is found that higher interests towards a subject matter are associated with matching between teaching and learning styles (Shafie and Alias 2007). This finding is similar to Ayrel and Nafalski (2000) who found that students have better interest in a subject when the teaching style of the lecturer matches their styles. While Indiana University Teaching Handbook says that teachers tend to teach in the style in which they learn best.

It is important that good instructors need to adopt their teaching styles to meet the needs of their students, where few researches support the view that when students learning preferences match their instructor's teaching styles, student motivation and achievement usually improve (Miller 2001; Stitt-Gohdes 2003). The knowledge of learning style will help the instructors carry out the role of the leadership in class. Some of these can be explained as the followings: (i) the instructor's role according to diverging learning style must first of all be a good motivator, (ii) the instructor's role according to assimilating learning style must be very knowledge and expert, (iii) the instructor's role according to converging learning style must be a good coach, (iv) the instructor's role according to accommodating learning style must use his influence, not his authority.

To satisfy these students' own feeling of leadership, priority should be given to group discussions and group work and they should be provided with new cultural forms to allow them to replicate what they have learned in class in real life. The instructor must build an effective communication with students of this group and should use them to influence and reach small groups in the class. Student of accommodating learning style can act as a leader to students of this group when they are successful. Even small success should be used to reinforce the belief felt for them because they will be an incentive for new practical for new practical discoveries. Also, in order to awaken strong emotion over these students, they should be united around common value and their commitment to the objective show by these values should be maintained (Sadullah Dede, 2009). If teaching style of the instructor matches the learning style of the student, the learning outcome will be improved. But teaching style of the instructor comes from which they learned best. Therefore, if matching the both learning style of the student and the instructor, their learning outcome will get more efficient.

In the previous work, the Kolb's learning style was applied and used in the initial stage of the proposed framework to assess the learning style of the students attending the SAOC. The aim of this classification was to identify the learning process which was most suitably for the students to develop their learning outcome (Vonkdarunee,2012). Furthermore, the Kolb's learning style was also applied and used to assess the learning style of the instructors. That was to investigate and confirm the relationship between the learning styles of the instructor and the students. The results of the previous work showed that when learning styles of the instructors and the students are the same, Accommodator style, the learning performance of the students are highest comparing to when students are matched up with instructors with other learning styles.

This paper will consider the relationship between instructors' facilitator style and instructors' learning style, in which the facilitators' style is perfectly suitable to accommodate the older generation of military officers, accommodators.

3. The SAOC Learning Framework

From preliminary analysis, the results have shown that older generation of military officers are categorized as Accommodator style. They possess more experiences but perform poorly in examination when compared to new and younger generation of military officers. Moreover, the results have also shown that existing instructional technique leads to them not participating in the group activities and not developing the leadership characteristics. Since this older generation of military officers tends to get

promoted and become head of the division, they need to be able to conduct new and younger generation through their knowledge and experiences. Hence, the negative reinforcement focusing on this generation is applied when designing the learning process in the alternative learning framework presented in this paper.

As reviewed and mentioned in the previous sections, the individual differences of the students are among main difficulties the instructor needs to overcome in order to reach the desired learning outcomes. This included designing appropriate learning tools, activities and processes to be utilized. Practically however, this is rather difficult since the backgrounds of each student are varied greatly. This is especially true for the SAOC within the RTAF where educational background could range from high school level to post doctorate degree, and the age could cover as large as 2 generations. Although traditional group learning approach is considered most suitable in this situation and could make use of the individual differences in an advantage way, it could not reach the expected outcome because of the very same individual differences. The framework presents an alternative learning process of SAOC as shown in Figure 2.

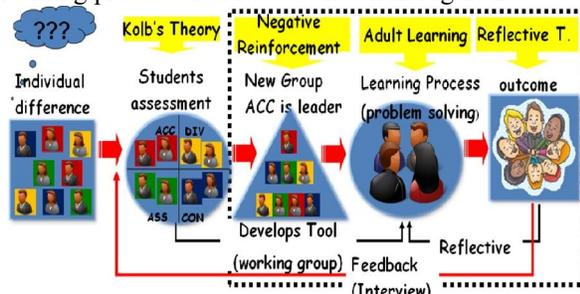


Figure 2: The SAOC learning framework

Figure 2 shows the proposed an alternative SAOC learning framework. Unlike other existing methods, this proposed framework is designed to both accommodate and utilize the individual differences of the students. Firstly, students are assessed and classified based on their learning styles. This is conducted by applying the Kolb's learning style model. Group learning approach is still used as the learning activity. This is because the group learning approach provides students with student center environment, and also allows student the freedom to express and share knowledge. However, with the further modification, the framework proposes to apply the concept of negative reinforcement to the traditional group learning approach. After the classification of student's learning style, the student with the Accommodator style is selected and place as the leader of each group. Typically, the student with the Accommodator style is represented by the older generation of the military officers. Since the SAOC's

objective is to prepare military officers for the executive and staff personnel at the division level, this group needs to develop the leadership characteristics and prepare for the future professional responsibility. Currently, due to the individual difference and existing learning framework, this is not the case. This negative reinforcement to the student with the Accommodator style proposed in this framework is to improve student's motivation and provide student opportunities to develop leadership characteristics as well as an opportunity to utilize their experience while conducting group learning processes.

As for the leaning process, the concepts of adult learning and constructivism are utilized in the proposed SAOC learning framework. Hence, problem solving exercises are designed to facilitate adult learning since adults are motivated to learn from being in the situation in which they see a need to learn and most suitable learn from their experiences. Moreover, constructivism is also applied when designing the exercise to allow students to construct their own knowledge on the basis of interaction with their environment. Finally, since individuals engage to explore their experiences in order to lead to new understandings and appreciation, the reflective theory with an emphasis on the concrete experience is applied for the evaluation of the student's performance in this paper. More specifically, together with performance evaluation by the SAOC examination committee, five point reflection scales is used for the analysis of the performance by measuring and comparing the student's score.

According to Vonkdarunee (2012), the results have shown that the students with the Accommodator style perform better in the designed environment. This is because with the group learning approach and problem solving exercise they can utilize and share their experiences with other members as well as conduct the learning process of the group more constructively and effectively. Furthermore, the students engaging in the active learning can make their own meaning and construct their own knowledge in the process. Inevitably, this has led to better learning outcomes. Besides, changing position from member to become leader of the group plays an important role to motivate student to accept more responsibility. This is in contrary to the situation when the students with the Accommodator style are just member of the group. The accommodator who has taken as members, they always obtain low scores and achievements in terms of learning outcome.

After vonkdarunee, 2012, we extend the previous work, in which the result has shown that Kolb's learning style model is used to assess the learning style of the instructor as well. This is based on the belief that the instructor usually tends to teach in the style in

which he/she learns best. In another words, the teaching style is the reflection of their past learning experiences, where this proposed framework can then further extend to match the learning style of the instructor and the students to create an environment where the learning outcomes can be maximized.

In this paper, we will introduce the results of previous work to find which facilitators' style the instructors have the instructors' learning style. Besides, we also find the relationship between instructors' learning style and instructors' facilitator style which has shown the promising indication that the students performance have been improved.

4. Case Studies

The instructors' facilitator style are considered and used to explain the relationship between the instructors' learning style and the instructors' facilitator style, where we found that the highest students learning outcome are obtained. The details are given in the following sections.

4.1 Research process

In the framework consists of 4 phases namely: Phase 1: Survey of sampling population, Phase 2: Experiment process following the proposed alternative SAOC learning framework, Phase 3: Analysis and comparison of the learning outcomes, Phase 4: Verification to confirm the results which had been done in the previous work. Moreover, in this paper, each instructor was evaluated the facilitator style by the students (10 members/group), where the results and discussion have shown in the following sub section 4.2.

4.2 Result and discussion

From the Table 1, the results have shown that when learning styles of the instructors and the students are the same, the students are highest comparing to when students are matched up with instructors with other learning styles. Moreover, the results have shown that interestingly matching the instructor and student with both the Assimilator and Converging style leads to the lowest scores. More specifically, the findings suggested that the matching between Accommodator instructor's style and Diverging student's learning style produces the same learning outcomes as when matching Diverging instructor's style with Accommodator student's learning style. Both the matching shows good learning outcome.

Furthermore, the latest results show that the instructors who have accommodator and diverger learning style are democratic facilitator style and the instructors who have converger and assimilator learning style are laissez-faire and authoritarian facilitator style respectively. In addition, the instructors with accommodator learning style can achieve the best students learning outcome, in which the democratic facilitator style has been implemented.

Alternatively, the instructors with assimilator and converger learning style indicated that the low achievement students learning outcome are obtained, where the authoritarian and laissez-faire facilitator style have been implemented.

It was explained that the students who have accommodator learning style enjoy carrying out plans and involving themselves in the new and challenging experiences. They rely more heavily on people for information than on their own technical analysis. When the instructors who have democratic facilitator style approach the students, she/he arranges some things and discusses potential improvements, asks group to review objective and helps it make an informed decision. She/ He helps the group make a choice and maintains that choice. For group relation, multiple-channel communications come from the facilitator to members and among members. Both facilitator and members play their roles, with each having their job and responsibilities in participation. According to Miller, 2001; Stitt-Gohdes, 2003, the instructor's role according to accommodating learning style must use her/his influence, not his authority. It was then determined that the same learning style of both instructor and student as well as the democratic facilitator style could improve the student learning accomplishment.

The converger learning style student who has the ability to solve problems and make decisions based on finding solutions to questions or problems. He prefers to deal with technical tasks and problems rather than with social issues and interpersonal issues. When the instructor who has laissez-faire facilitator style approaches the students, he arranges nothing except venue, which provides a general overview of the objective and then lets the group do what it wants. He does not have defined procedures, where group leaders choose their own procedures. For group relation, clans are formed, some members isolated, meeting gets bogged down. With the facilitator's laissez-faire attitude, some members take control while others remain passive in participation. These are not the same as Miller, 2001; Stitt-Gohdes, 2003 that the instructor's role according to converging learning style must be a good coach because of their contrast of the facilitator style and learning style.

After the first case, the framework has been verified by the other course. The results were shown in Table 2, it shown that the similar learning outcome was obtained, which means that we could make the same conclusion with the above case.

The instructor who has assimilator learning style, has authoritarian facilitator style. When he approaches the converger students, he arranges everything without discussion and presents the objective to the group, follows it without fail; if the disagreement can impose

his/her approach, she/he informs the group about the procedures and prohibit any deviation. For the group relations, group members focus on the facilitator which is one-way communication. In group participation, the facilitators direct everything. There is no sense of initiative created. However, the students may have been good in learning outcome but they obtained less learning outcome because the instructional tool (group learning) was not suitable for converger and assimilator students.

Table 1: The performance score of the first course

Instructors' Facilitator style	Instructors' Learning Style	Students' Learning Style	Team's score		Individual's score	
			Score (%)	Grade	Score (%)	Grade
Democratic	Accommodator	Accommodator	85.20	A	89.00	A
Democratic	Accommodator	Accommodator	84.80	A	89.00	A
Democratic	Diverger	Accommodator	84.00	B+	88.00	B+
Democratic	Diverger	Accommodator	83.90	B+	88.00	B+
Democratic	Accommodator	Diverger	82.10	B	87.00	B+
Laisser-faire	Converger	Converger	81.70	B	86.00	B
Democratic	Accommodator	Assimilator	80.40	B	86.00	B
Authoritarian	Assimilator	Converger	79.00	C+	82.00	C+

Table 2: The performance score of the second courses

Instructors' Facilitator style	Instructors' Learning Style	Students' Learning Style	Team's score		Individual's score	
			Score(%)	Grade	Score(%)	Grade
Democratic	Accommodator	Accommodator	89.48	A	93.00	A
Democratic	Accommodator	Accommodator	87.96	B+	92.00	B+
Democratic	Accommodator	Accommodator	87.05	B+	92.50	A
Democratic	Accommodator	Assimilator	86.80	B+	87.00	B
Democratic	Accommodator	Converger	85.54	B	88.00	B+
Democratic	Diverger	Diverger	82.87	B	88.50	B+
Authoritarian	Assimilator	Converger	81.90	C+	87.00	B
Laisser-faire	Converger	Assimilator	82.42	C+	86.00	C+

5. Conclusion

This is the extended work, in which the relationship between the instructors' learning style and the instructors' facilitator style were considered, where the student learning outcomes improvement can be achieved. From the previous work, the obtained results were confirmed that the SAOC learning framework were suitable for the individual difference, which can be used for continuing professional development. In this work we found that the accommodator instructors' learning style that can achieve the students learning outcomes was the democratic facilitator style. But the assimilator and converger instructors' learning style that the low achievement student learning outcomes are the authoritarian and laissez-faire facilitator style. However, this framework can be used for other learning individual difference development.

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