SELF-DIRECTED LEARNING IN A HIGHER EDUCATION ENVIRONMENT: DO PRE-UNIVERSITY EDUCATION AND LEARNING STYLES PLAY A ROLE?

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ABSTRACT

The majority of students undergoing the medical programme at the International Medical University (IMU) transfer to partner medical schools worldwide after the phase 1 programme. Thus it is desirable to inculcate self-directed learning (SDL) skills to enable them to adapt to the varied learning strategies of these schools. As learner characteristics importantly influence successful SDL, the effect of learning styles and pre-university education on the appreciation of SDL in relation to the learning resources was assessed in 708 students undergoing IMU's medical curriculum. Male students rated appreciation of SDL significantly higher than females. The ratings were consistently higher for SDL as a good learning method compared to the utilisation of resources for all the semesters with a positive correlation. The majority of students entering IMU have experienced STPM, (Malaysian equivalent of matriculation), South Australian matriculation (SAM) and GCE-A level. Although difference in responses is seen among the various pre-university education groups, this is not significant. Generally, there are more reflective than active, sensing than intuitive, visual than verbal and sequential than global learners. Appreciation of SDL and utilisation of IMU resources are positive irrespective of learning style. These findings indicate that the majority of students, irrespective of learning style and pre-university education appreciate the need to develop SDL. The study identified "receiving", "adaptation" and "acceptance" phases in students as they progress and adapt through a higher education environment. Importantly, providers of higher education must be aware of these phases and address them accordingly.

INTRODUCTION

Inculcation of self-direction, independence and self-reliance is an ongoing process. It is dependent on the learner and the learning environment. Learners pursuing higher education are expected to be self-directed and self-motivated for them to fully benefit. While some students may achieve this expectation with relative ease, others might find it a daunting challenge. This would especially apply to some students whose entire educational life have been one of rote memorisation and whose main aim is to achieve high marks during examinations through reproduction of the facts they have learnt. These conditioned and entrenched attitudes of students may contribute towards resistance of new learning methods encountered within a higher learning environment (Townsend, 1999). Some institutions of higher education have thus expressed concern about students having difficulty in adapting to the SDL style expected by a higher education environment (Shepherd, 2006; Lightfoot, 2006) and have realized the need to create strategies that will enable students to develop SDL (Van der Steeg, 2003).

The International Medical University's (IMU) philosophy is to encourage SDL and has implemented an integrated, problem-based learning (PBL) curriculum since 1992, when its medical faculty was first founded. To this end, in addition to PBL, other traditional and innovative resources are provided, including printed materials, library, clinical skill sessions (CSU), communication with peers, communication with subject matter experts, museum, laboratory sessions, assigned independent reading (AIR), structured independent learning online system (SILOS) and online learning interactive system (OLIS). Provision of AIR, SILOS and OLIS, which are information technology and computer-assisted learning resources, is to compliment the effectiveness of a PBL curriculum (Jones, Higgs, de Angelis & Prideaux, 2001). An earlier study showed that students ranked printed materials as their most preferred learning resource for SDL.

This may indicate that students while adapting to the different learning strategies of a higher learning environment, are more comfortable with and thus prefer the learning resource to which they have been accustomed to (Mala-Maung, Azman & Abas, 2004). Thus, while institutes of higher education strive to create learning environments to promote SDL, it is equally important to determine the perception and preparedness of the learners for which the environment is created and with which they interact. Developing SDL being a balance between the learner and the environment may not be successful if learners lack independence or if there is a lack in resources (Kaufman, 2003). This study aims to determine how prior knowledge obtained from pre-university education that the IMU students have experienced and their learning style preferences might have influenced their perception of SDL in relation to the learning resources provided, in a higher education environment.

THE STUDY

Respondents comprised students attending semesters 1 to 5 of the phase 1 IMU medical programme. Participation was voluntary and anonymous. The respondents comprised Semester 1 (n=181, 92%); Semester 2 (n=162, 93%); Semester 3 (n=144, 96%), Semester 4 (n= 122, 80%) and Semester 5 (n= 99, 83%). Data was collected via a questionnaire that was designed to address particulars of students and perception toward the various aspects and appreciation of SDL and the IMU resources.

RESULTS

Relationship between pre-university education and appreciation of SDL

The pre-university education that the students had experienced were categorised into 3 main groups namely South Australian matriculation (SAM, n=152), STPM (Malaysian higher certificate of education, n= 110) and GCE: A-level (n= 247); and188 had undergone other various types of education. Appreciation of SDL as a learning method and for the IMU resources in relation to the types of pre-university education was positive irrespective of the pre-university education. The mean values were 6.10 and 5.50 for SDL as a good learning method and for IMU resources respectively (scale of 0-10). STPM students scored the highest mean for appreciation of SDL as a good learning method (6.17) followed by GCE and SAM (6.09, 5.83), although it scored lowest for the appreciation of IMU resources (STPM<SAM<GCE = 5.21<5.37<5.53). However, the difference in mean was not significant between the major groups of pre-university education.

Relationship between pre-university education and utilisation of resources

The preference for the printed materials as a learning resource was scored highest (mean 4.4) and AIR lowest (2.5) irrespective of pre-university education. The preference, in decreasing order was CSU and library > communication with peers > communication with experts > museum > PBL > laboratory > SILOS > OLIS. The highest scores for utilisation of printed materials, library and communication with experts were seen with the SAM students. STPM students scored the highest means for PBL, communication with peers, SILOS and OLIS, while GCE students scored museum, laboratory and AIR highest.

Relationship between learning style and appreciation of SDL

There were more reflective than active (n=374:304), more sensing than intuitive (n = 469:187), more visual than verbal (n = 478:106) and more sequential than global (n = 415:259) learners at IMU. Generally, as indicated by the average rating, the appreciation of SDL and of the IMU resources was positive. As shown in Table 1 The appreciation of SDL was scored higher than the appreciation of IMU resources irrespective of the different learning styles. Both visual and verbal learners scored higher means for the appreciation of SDL compared to the IMU resources with a significant difference for the IMU resources between the two types of learners.

Table 1 *Relationship between learning style and appreciation of self-directed learning*

	SAM		STPM		A-Levels		Others		Overall	
	Q9	**Q10**	**Q9**	**Q10**	**Q9**	**Q10**	**Q9**	**Q10**	**Q9**	**Q10**
Active	5.84	5.42	6.11	5.11	6.07	5.48	6.40	5.97	**6.11**	**5.50**
Reflective	5.87	5.38	6.27	5.52	6.18	5.72	6.23	5.91	**6.14**	**5.63**
Sensing	5.87	5.54	6.46	5.65	5.98	5.54	6.18	5.94	**6.12**	**5.67**
Intuitive	5.88	5.06	5.86	4.57	6.39	5.57	6.49	5.82	**6.16**	**5.26**
Visual	5.92	5.38	6.32	5.64	6.32	5.78	6.20	5.83	**6.19**	**5.66**
Verbal	5.52	5.40	5.75	4.35	5.45	4.80	6.10	5.81	**5.71**	**5.09**
Sequential	5.77	5.36	6.20	5.61	6.16	5.58	6.09	5.80	**6.06**	**5.59**
Global	5.98	5.41	6.42	5.23	6.14	5.73	6.65	6.14	**6.30**	**5.63**

Q9: Appreciation of SDL **Q10: Appreciation of IMU Resources**

Relationship between pre-university education and acquisition of SDL traits
The type of pre-university education did not seem to influence acquisition of SDL traits as perceived by learners. These traits were scored lowest by learners with SAM as their pre-university education (see Table 2).

Relationship between learning style and acquisition of SDL traits
As Table 3 indicates, learners perceived that traits pertaining to SDL are acquired through learning at IMU regardless of learning style. The traits ranked highly are being independent, taking initiative and taking responsibility of one's own learning. Active learners scored significantly higher for teamwork compared to reflective learners. Visual learners perceived that they could plan their own learning and manage their time better than the verbal learners.

Relationship between semester and appreciation of SDL
Students of all semesters perceived SDL as a good learning method (average mean score of 6.1) and that the IMU resources were useful for SDL (average mean score of 5.6). The ranking scale used was from 1 to 10. The mean values, in relation to each semester, for appreciation of SDL were 6.34, 5.90, 6.06, 6.17, and 6.14 (from semester 1 to 5 respectively). The mean values, in relation to each semester, for IMU resources were 5.96, 5.38, 5.41, 5.70, 5.54 (from semester 1 to 5 respectively). Learners in semester 1 scored the highest means for appreciation of SDL and for IMU resources while semester 2 students scored the lowest. The difference was significant between the two semesters. Although there was a slight negative correlation with the semesters, the correlation coefficient was not significant.

Table 2 *Relationship between pre-university education and acquisition of SDL traits*

Pre-U		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
SAM	Mean	3.97	3.99	4.01	3.90	3.00	3.67	3.36	3.20
	N	152	152	152	152	151	151	151	151
	SD	.801	.700	.780	.926	.987	.900	.990	1.033
STPM	Mean	4.17	4.14	4.23	4.06	3.02	3.70	3.52	3.45
	N	108	109	109	109	110	110	108	110
	SD	.881	.810	.801	.848	1.165	1.036	1.054	1.046
A-Levels	Mean	4.16	4.21	4.19	4.11	3.14	3.80	3.50	3.35
	N	247	247	247	247	244	242	243	243
	SD	.838	.764	.785	.834	1.015	.953	.981	1.014

The relationship between semester and the appreciation of SDL based on the major types of pre-university education is as shown in Figure (1). The appreciation for SDL was consistently higher compared to the utilisation of IMU resources for all three types of pre-university education across all the semesters. The initial enthusiasm, a slow decline during the mid-phase semesters and the eventual enhancement of appreciation was clearly seen in learners with SAM as pre-university education.

Relationship between gender and appreciation of SDL

Result of the t-test shows that the mean value for appreciation of SDL seen with male students (6.34) was significantly higher than with the mean value for female students (5.97) with regard to the appreciation of SDL as a good learning method. However, there was no significant difference between the genders for the utilisation of IMU resources.

DISCUSSION

The learning resources which are provided at the IMU include among others, PBL, printed materials, library, museum, communication with peers, communication with subject matter experts, CSU, laboratory sessions, AIR, SILOS and OLIS. The provision of a varied mix of traditional and innovative learning resources is to ensure that learners develop the ability to acquire knowledge, skills and attitudes related to SDL through utilisation of resources in the form of group activities or as activities for individual learning. As Snell (2000) advocated, it is important to provide the right mix of learning activities to promote SDL.

Learners in semester 1 scored the highest means for SDL as a good learning method as well as for the appreciation of IMU resources. It is perceived that these students have not been exposed to the innovative learning resources and thus these may constitute novel means of learning. The learners may be have entered the university environment with great anticipation and expectation

Table 3 *Relationship between learning style and acquisition of SDL traits*

Learning Styles		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Active	Mean	4.09	4.12	4.12	4.03	3.36	3.77	3.51	3.44
	N	311	311	311	311	309	308	305	308
	SD	.851	.804	.790	.861	1.037	.946	1.000	1.046
Reflective	Mean	4.19	4.16	4.20	4.12	2.98	3.78	3.50	3.42
	N	381	382	382	382	379	378	379	379
	SD	.780	.706	.738	.833	.997	.893	.982	1.024
Sensing	Mean	4.15	4.13	4.17	4.06	3.18	3.77	3.52	3.43
	N	480	481	481	481	476	474	475	475
	SD	.807	.749	.754	.808	1.013	.916	.968	1.019
Intuitive	Mean	4.15	4.21	4.18	4.16	3.09	3.79	3.48	3.42
	N	190	190	190	190	190	190	187	190
	SD	.838	.745	.779	.906	1.063	.925	1.049	1.089
Visual	Mean	4.16	4.14	4.16	4.06	3.15	3.81	3.52	3.45
	N	486	487	487	487	485	485	481	484
	SD	.818	.755	.786	.878	1.027	.926	.987	1.027
Verbal	Mean	4.02	4.05	4.16	4.05	3.01	3.57	3.38	3.11
	N	111	111	111	111	109	108	109	109
	SD	.842	.784	.720	.791	1.093	.978	1.104	1.165
Sequential	Mean	4.16	4.16	4.18	4.08	3.16	3.75	3.50	3.43
	N	428	428	428	428	424	424	421	424
	SD	.789	.754	.750	.841	1.017	.900	.940	1.029

Global	Mean	4.13	4.12	4.15	4.09	3.14	3.85	3.53	3.44
	N	260	261	261	261	260	259	259	259
	SD	.825	.755	.776	.848	1.039	.916	1.046	1.049

1=Be Responsible for my own Learning
2=Learn to be more independent
3=Take my own initiative in learning
4=Be disciplined learner
5=Work as part of a team
6=Plan my own learning
7=Evaluate my own learning
8=Manage my time better

Which are contributory factors towards instilling new learning modalities. This may be termed the "receiving/receptive phase" where any new experience in relation to learning especially SDL constitute a novelty and thus the students in their eagerness to learn, are receptive. This stage may be the best period to initiate new teaching/learning strategies, taking into consideration the traits that have been already acquired from pre-university education. The implementers must be sensitive to this receptive stage and must take advantage of it to promote student engagement in the learning resources and to develop and nurture SDL traits in the learners (El-Khawas, 2002; Van del Steeg, 2003).

The implementers must also ensure that the "honeymoon effect" does not develop. The "honeymoon effect" of a training programme as described by Boyatzis (2000), is seen as a situation in which the initial enthusiasm and expectancy of learners decline when the novelty of a new learning experience wears off after some period of time. This may be reflected by the results seen with the semester 2 students who exhibited the lowest mean values. It may also mean that the learners have adapted to the learning environment and have taken things in their stride. The implementers and the learning environment must ensure, as much as possible, that there is no contributory factor of disillusion. Thus this period may be termed the "adaptation phase." During this phase the implementers must be aware that reinforcement is crucial to maintain the initial interest and enthusiasm.

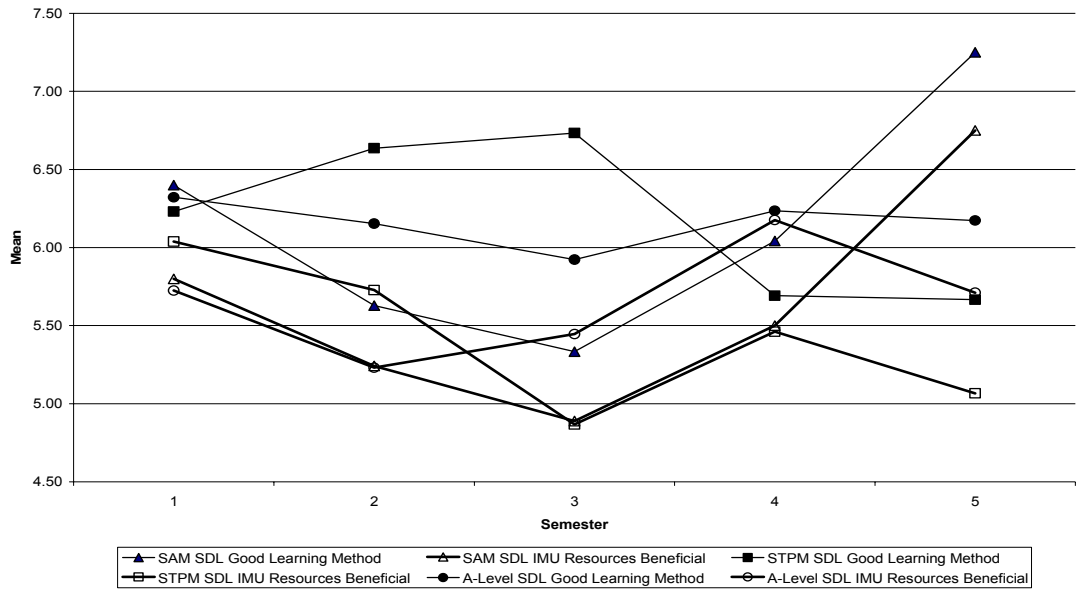

Figure 1 *Relationship between semester and appreciation of self-directed learning (major types of pre-university education*

The increase in appreciation which is seen as the students progress into the higher semesters may reflect a third phase of the learning process. This phase may be the period during which the

learners, after having experienced SDL may have a higher appreciation of its value and have accepted it as a good learning method. This phase may be termed the "acceptance phase." The implementers must ensure that the resources for SDL are appropriate for self-reinforcement of SDL traits. The findings indicate that it is essential to plan, implement and review the resources or the mode of delivery in order to sustain the continued interest and enthusiasm of learners throughout their learning period. As indicated by this study, the development of learning tends to occur in stages and thus there is a crucial need to provide a formal learning environment that is supportive (Grow, 1991). Likewise, as development of self-direction and independence occur over a period of time, learners must be encouraged as appropriate (Van der Steeg, 2003). The enhanced appreciation of self-directed learning as the students advance along the semesters may be due to the increasing maturity of learners and the development of confidence, independence and interpersonal skills which develops with a PBL curriculum (Steinert, 2004; Das Carlo, Swadi & Mpofu, 2003).

It is seen from this study that there is no significant difference between the different learning styles and the learners' appreciation of SDL or the IMU resources. The knowledge of an individual's learning style provides additional support for effective instruction and aids in the delivery of learning tools. This may be advantageous for the learners as an indicator of their strength or weakness and thus enable them to develop an appropriate approach to improve their academic performance. However, although this knowledge of individual learning styles is a positive addition to learning, Felder et al stated that it is advisable for implementers to address the different learning styles of students, as it is advantageous for them to develop the ability to adapt to different learning styles (Felder, Felder & Dietz, 2003). Additionally, Felder and Brent (2005) stated that an individual learning style is neither preferable nor inferior to another and as such, students should be equipped with the skills of different learning styles to enable them to cope effectively as professionals.

Perception of students on the acquisition of SDL traits revealed that active learners felt that they benefited from learning through teamwork more than the reflective learners. This finding is in agreement with earlier studies (Felder & Spurlin, 2005) where active learners are found to enjoy and learn better when working with peers. Visual learners' perception of their ability to plan their own learning and time management better may be attributable to the IMU learning environment and provision of resources promoting visual learning preferences. However, learning style preferences did not appear to significantly affect the acquisition of other learning traits including responsibility, independence, initiative ability, discipline, teamwork, planning and evaluating learning and time management. Another study by Mala-Maung, Azman & Abas, (2006) showed that although variations in the appreciation of some learning skills pertaining to SDL were observed among students with different learning style preferences, problem-solving skill was seen as being most appreciated, irrespective of the learning style

This study has identified the presence of learners with different preferences of learning styles in relation to their appreciation of SDL, utilisation of resources through which it can be acquired and the acquisition of SDL traits. As learners absorb and process information differently, based on their learning styles, it is important for implementers to provide, as much as it is feasible, a balance or a variety of learning media to encompass the different learning styles. This will enable students to be taught partly in a manner they prefer and partly in a manner, which is less preferred. Being able to learn in their preferred styles should enhance their willingness to learn, and learning in the less preferred style should help them to develop thinking and problem-solving skills. The higher education environment should provide a variety of resources to enhance the development of SDL in students with different learning styles. It is therefore advantageous for students to be taught in the style they prefer to keep them from being too uncomfortable for learning to occur as well as in the less preferred style to help them to develop diverse capabilities that may be needed for them to function effectively in their careers as professionals (Felder, Felder & Dietz, 2002).

The finding in this study in which male students appreciating SDL more than female students corroborates with the findings of an earlier study which noted the difference in appreciation of

SDL between the different genders of engineering students. While male students at a low end of academic record with certain learning style preferences were more likely to succeed in engineering compared to other learning styles, there was no statistical significance among female students. However, learning styles did not seem to affect students who have strong predictors of success (Felder, Felder & Dietz, 2002). Reio (2004) also noted in his study that female participants have lower levels of SDLR. Age was found to statistically relate to SDLR, where older participants were more likely to think that they were self-directed. In addition to the various attributes and characteristics that have been identified in this study, other relevant personal characteristics that may need to be considered for the development of SDL are family attributes and practices, and cultural background of the learner as they are especially relevant to the success of group-learning learning (Das Carlo, Swadi & Mpofu 2003).

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