The relationship between learning styles and teaching methodology with the achievement of civil engineering studies at secondary technical school in Negeri Sembilan

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ABSTRACT

The purpose of this descriptive study was to survey the relation between students's learning style and teacher's teaching methods which apply towards the achievements in CES subject in three Technical School in Negeri Sembilan. Respondent of the research involving 180 students and a questionnaire was used as research instrument. This questionnaire contained two parts, which were Part A; seven questions related to background of respondents and Part B containing 36 items related to 3 types of learning styles and 2 types of teaching methods. The acquired overall alpha value was 0.844 and possessed high trustworthiness questions. Data were analyzed using SPSS (Statistical Package for the Social Science) software version 15 to acquire frequency, percentage and mean that were later shown in table form. Acquired study findings showed that auditory learning style was the most dominant learning style which applied among the students whereas demonstration method was the most dominant teaching method used among the teachers. In this study, it was discovered that no significant relation between visual and kinesthetic learning style with the achievements in Civil Engineering Studies (CES) subject whereas there was a significant relation between auditory with the subject achievements. For analysis of relation between learning styles and teaching methods there was a significant relation between both of them. This research suggest a further research to find the effectiveness of teacher's teaching methods which must be required to attain correct information and used it to solve the student's achievement problems.

Introduction

One of the main goals of National Education Policy is to have world class education and hence education process is an important field in our daily life especially at schools which is considered as a center of knowledge development. The recognition given to education field caused an implication and serious impact to teaching profession which is an agent of knowledge. If teachers play their appropriate role then we could meet the end product needed by our national education. The smart learning pattern will bear a smart students. How a student learns in a class and does revision outside the classroom usually begins with the way a certain teacher teaches and gives an effective learning from the interesting teaching method. Ruggiero (1991) stated that man has two parts of brain. They are left hemisphere and right hemisphere. The left hemisphere functions as problems solving in form of analytic which means using a logical method of thinking. It is good at solving mathematical problems. While the right hemisphere functions as to see something unique, imaginative, perception, visual and to control our feeling. It is useful in order to think creatively. According to Mahathir Mohammad (1998), Malaysia has one of the best education system among the third world country. So, in order to succeed it must be related to the sixth element in Vision 2020 that is to have scientific and progressive society, innovative and to think far ahead.

In modern society, teaching and learning process is carried out systematicaly especially in teaching and learning methodology. Without systematic process, effective teaching and learning will not be able to achieve. According to Khalid (1993), effective learning means a regular, systematic,orderly and optimum effort to integrate and make full use of learning components to achieve the maximum success.

Critical and Creative Thinking Skills (CCTS), are the basic foundation knowledge required by the teachers to incorporate them to the students. According to George (1970), the definition of thinking skills is to look at it as a process of problem solving and a complex natural behaviour. However, according to Edward de Bona (1997), thinking skills are related to literal thinking which carried the meaning not only problem solving, but to think from various perspectives to solve problems. For the thinking skills to develope and for students to acquire it, ones must think critically and creatively. Poh Swee Hiang (1999) states that critical thinking is vital to create the citizen who knows and afford to utilise their thinking in order to face various challenges, stress and changes while creative thinking will develope the individual to be inovative and more creative, initiative, imaginative , humanistic value and artistic. As both skills acquired by the students through stimulation and training,

they will apply them to their daily learning and the optimum learning will occur.

Various problems will arise, especially for form four students who are facing with the problems of adjusting themselves because of the different environment and situation from a normal school to technical school. May be this is one of the possible factors that lead to low academic achievement in technical school. The problems will be very obvious when pupils could not study civil engineering subjects effectively. The problems will continue as they could not apply the knowledge learned during engineering courses.

The teaching skills of civil engineering school need a teacher to reinforce the autority in the classroom, using systematic teaching technique and the skills to compose examination questions. To communicate with students, a teacher requires to observe the students' thinking learning and able to analise and understand their thinking styles. Although teachers know these are an ideal practise, they do worry because civil engineering studies is a hierarchy subjects as the understanding of each topic depends on the level of understanding from the previous skills. If a student performed poorly in the basic level, there is a great possibility for the student to fail.

Various methods were used by the students in studying civil engineering at a higher level. There ara students tend to spend their time by memorizing in order to solve mathematical problems done by others, rather than to solve them by themselves. These problems happened to most students who learn by memorizing formulae but do not know how to apply those formulae and solving the problems in different situation. Besides students, teachers also geared to apply memorizing method, that is to ask pupils to memorize the routine skills to solve problems, without giving the opportunity for students to think. Usually, small classes are able to help teachers to improve their teaching methodology and ways to interact with students and paying more individual attention (Wagener 1991).

There are several factors that influence the achievement of the students as described above. Based on these factors, the researchers try to relate the relationship between learning styles and teaching methodology with the achievement of civil engineering studies.

Research objectives

This research is aim to find out the relationship between learning styles and teaching methodology with the achievement of civil engineering studies. The main focus are :

1) To identify the most dominant learning styles such as visual, auditory and kinesthetic that students usually practise in civil engineering studies.
2) To identify the teachers' teaching methodology which is the most dominant such as lecture method and demostration method in civil engineering studies.
3) To identify students' achievement level in civil engineering subjects.
4) To identify whether there is a significant relationship between learning styles such as visual, auditory and kinesthetic with the achievement in civil engineering studies.
5) To identify whether there is a significant relationship between teachers' teaching methodology such as lecture method and demostration method with the achievement in civil engineering studies.
6) To identify whether there is a significant relationship between students' learning styles such as visual, auditory and kinesthetic with teachers' teaching methodology.

Research question

To achieve the objectives which are clearly described above, here are a list of the reseach questionaire that we should try to find out answers in this research :

1) What is the most dominant learning style such as visual, auditory and kinesthetic, practised by the students in civil engineering subjects?
2) What is the most dominant teachers' teaching methodology such as lecture method and demostration method in school of civil engineering subjects ?
3) What is the level of achievement in school of civil engineering subjects?
4) Is there a significant relationship between learning styles such as visual, auditory and kinesthetic with the achievement of civil engineering subjects?
5) Is there a significant relationship between teachers' teaching methodology such as lecture method and demostration method with the achievement of civil engineering subjects?
6) Is there a significant relationship between students' learning styles such as visual, auditori and kinestetik with teachers' teaching methodology.

Research hypothesis

Research hypothesis are :

H_o1 There is no significant relationship between the visual style of learning with the achievement of civil engineering school subjects.

H_o2 There is no significant relationship between the auditory style of learning with the achievement of civil engineering school subjects.

H_o3 There is no significant relationship between the kinesthetic style of learning with the achievement of civil engineering school subjects.

H_o4 There is no significant relationship between demostrating teaching method with the achievement of Civil Engineering School subjects.

H_o5 There is no significant relationship between demostrating teaching method with the achievement of Civil Engineering School subjects.

H_o6 There is no significant relationship between the visual style with the teachers' teaching methodology.

H_o7 There is no significant relationship between auditory learning style with the teachers' teaching methodology.

H_o8 There is no significant relationship between kinesthetic learning style with teachers' teaching methodology.

The importance of the research

The result of this research is important for the university autority especially Education Faculty in order to train and prepare Civil Engineering School teachers to acquire skills, knowledge, personality and teacher preparedness in carrying out their duties in teaching.

Besides, the research in important for the Malaysia Ministry of Education to pick and choose the future Civil Engineering School teachers that can fulfill all the teaching aspects needed . This research is also important for the school in order to achieve good performance and increase the students achievement result that can keep up the good name of the school itself if there are teachers that can cater those listed criteria as a teacher.

For Civil Engineering School teachers, this research is vital for them to make up their weaknessess and lackness during their teaching process, so that it is suitable and adequate with students learning style. They can also increase their performance in Civil Engineering School subjects.

This research is also important for the society to educate their people with knowledge cultural and to instill good moral values that can fit with the education objectives in Malaysia.

Limitation of the research

The research carried out covering several aspects of learning such as visual style, kinesthetic and auditory, while teaching methodology such as lecture method and demostration method and students achievement in Civil Engineering School subjects. In this research, the researcher uses only one type of research instrument to carry out the survey, that is using questionaire survey form. This survey form is the easiest and suitable to be given to the students. Researcher carried out the survey to Form Four students because form five students have to concentrate on their study for their incoming 'Sijil Pelajaran Malaysia' examination. Researchers chose schools in Negeri Sembilan because there are many technical schools and it is very convinience to carry out such research. However, the validity of the research depends on the respondents' honesty in answering the survey form.

Methodology

The design of the research is in form of descriptive. Sample of the survey used is Simple Random Method. This type of sample is suitable for Form four students in Technical Schools who are taking Civil Engineering School subjects. Research instrument is a set of questionaire using five points scale and consists of part A and part B. The initial research carried out is used to analyse the validity of the survey is 0.844.

Result

The analysis of research findings about learning styles and teaching methodology with the achievement of Civil Engineering School subjects was done according to low, moderate and high level with every aspect as discussed. Below are the classification factors based on mean analysis.

Value	Level
1.00 – 2.33	Low
2.34 – 3.67	Moderate
3.68 – 5.00	High

Analysis of Students Achievement Level

Table 1 shows the respondents data according to low , moderate and high level of achievement in Civil Engineering School subjects. Majority of the respondents are in moderate level with 63.3 percent which represent 114 repondents. A total of 47 respondents which is 26.1 percent are in high level and 10.6 percent that is 19 respondents are in low level.

Visual learning style analysis

Table 2 shows the respondents data according to low, moderate and high level for visual learning style. If we clearly observed, there are four respondents in low level with 2.2 percent, while 53 respondents are in high level with 29.4 percent. Majority of the respondents are in moderate level with 68.3 percent which are 123 respondents.

Auditory learning style analysis

Table 3 shows the respondents data according to low, moderate dan high level with auditory learning style. We noticed majority of 132 respondents are in high level with 73.3 percent and a total of 48 respondents with 26.7 percent are in moderate level. There is no respondent in low level.

Kinesthetic Learning Style Analysis

Table 4 shows the respondents data according to low, moderate and high level for kinesthetic learning style. We noticed 115 respondents are in high level with 63.9 percent and a total of 65 respondents with 36.1 percent are in moderate level. No respondent in low level.

Lecture teaching methodology

Table 5 shows the respondents data according to low, moderate and high level for lecture teaching methodology. We noticed no respondent is in low level. 70 respondents are in high level with 38.9 percent. Majority of the respondents are in moderate lever with 61.1 percent or a total of 110 respondents.

A Complete analysis of learning style and teaching methodology

Table 6 shows the level and mean for all the items which are auditory learning style, kinesthetic learning style and domestration Teaching methodology are in high level. Visual learning style and lecture teaching methodology are in moderate level.

Inference Analysis

There is no significant relationship between visual learning style with the achievement of Civil Engineering School subjects.

From data analysis, we found out the value of p=0.815 and it is higher than the value of a=0.05, so nil hypothesis and these means there is no significant relationship between visual learning style with the achievement of Civil Engineering School subjects.

There is no significant relationship between auditory learning style with the achievement of Civil Engineering School Subjects.

Table 8 shows the correlation relationship between auditory learning styles with the achievement of Civil Engineering School subjects. From the above table, we can conclude that the value p=0.002 which is smaller than the value of a=0.05, so nil hypothesis. This means there is a significant relationship between auditory learning styles with the achievement of Civil Engineering School subjects. The value of Pearson, r correlation had is 0.226** and it means the relationship is weak. The value of correlation, positive r shows relationship between auditory learning styles with the achievement of Civil Engineering School subjects is a direct relationship.

There is no significant relationship between kinesthetic learning styles with the achievement of Civil Engineering School subjects.

Based on the analyses data, the value of p=0.226 which is bigger than the value of a = 0.05, so nil hypothesis is accepted and this means there is no significant relationship between kinesthetic learning style with the achievement of Civil Engineering School subjects. The value of Pearson (r) correlation had was 0.083 and it means a weak relationship. The correlation value, positive r shows the relationship between kinesthetic learning styles with the achievement of Civil Engineering School subjects.

There is no significant relationship between lecture methodologies with the achievement of Civil Engineering School subjects.

Table 10 shows the correlation relationship between lecture methodologies with the achievement of Civil Engineering School subjects. From the above table, we can see that the value of p = 0.183 which is bigger than the value of a=0.05, so the nil hypothesis accepted. Its means there is no significant relationship between lecture methodologies with the achievement of Civil Engineering School subjects. The value of correlation Pearson (r) had is 0.100 and this means the relationship is very weak. The value of correlation is positive r shows the relationship between lecture methodologies with the achievement of Civil Engineering School subjects.

There is no significant relationship between demonstration methodology with the achievement of Civil Engineering School subjects.

Table 11 shows the correlation relationship between demonstration teaching methodologies with the achievement of Civil Engineering School subjects. From the above table, we can see the value of p = 0.886 which is bigger than the value of a = 0.05, so nil hypothesis accepted. It means there is no significant relationship between demonstration teaching methodologies with the achievement of Civil Engineering School subjects. The value of Pearson (r) correlation had 0.011 and this means the relationship is very weak. The value of correlation, positive r shows relationship between demonstrations teaching methodology with the achievement of Civil Engineering School subject directly.

There is no significant relationship between visual learning styles with the teachers teaching methodology

Based on data analysis, the value of p=0.000 which is smaller than the value of a=0.05, so nil hypothesis is rejected and this means there is a significant relationship between visual learning style and teachers teaching methodology. The value of Pearson (r) correlation is 0.491** and this means the relationship is moderate. The value of correlation, positive r shows the relationship between the visual learning style and teachers teaching methodology.

There is no significant relationship between auditory learning style and teachers teaching methodology.

Table 13 shows correlation relationship between auditory learning style and teachers teaching methodology. From the above table, the value of p = 0.000 which is smaller than the value of a=0.05, so nil hypothesis is rejected. This means there is a significant relationship between auditory learning style and teachers teaching methodology. The correlation value Pearson (r) is 0.283** and this means the relationship is weak. The value of correlation, positive r shows there is a direct relationship between auditory learning style and teachers teaching methodology.

There is no significant relationship between kinesthetic learning style and teachers teaching methodology.

Table 14 shows correlation relationship between kinesthetic learning style and teachers teaching methodology. From the above table, the value of p = 0.000 which is smaller than the value of a=0.05, so nil hypothesis is rejected. This means there is a significant relationship between kinesthetic learning style and teachers teaching methodology. The correlation value Pearson (r) is 0.415** and this means the relationship is moderate. The value of correlation, positive r shows there is a direct relationship between kinesthetic learning style and teachers teaching methodology.

Discussion

Research findings shows the highest average mean from the three learning styles is auditory learning style that is 3.94. The result of the research shows a large number of students practise auditory learning style, followed by kinesthetic learning style in a second place. Then it is followed by visual learning style. This information shows that majority of the students from the three technical schools in Negeri Sembilan practise auditory learning style for Civil Engineering School subjects.

From the research, it shows the highest average mean between the two teaching methodology is demonstration teaching methodology which is 4.31. From the above research, the students from the three technical schools in Negeri Sembilan prefer to study their Civil Engineering subjects through demonstration teaching methodology than lecture teaching methodology delivered by their teacher.

It is also found that majority students achieve moderate level for Civil Engineering School subjects with 63.3 percent. Meanwhile 47 respondents which represent 26.1 percent are in high level. 19 respondents are in low level with 10.6 percent.

Auditory learning style influences the achievement of Civil Engineering School subjects, while visual learning style and kinestetik is not influenced by the achievement of Civil Engineering School subjects in the learning process.

Based on the findings of the research, the relationship between teachers teaching methodology with the achievement of Civil Engineering School subject shows that the achievement of Civil Engineering School subjects is not influenced by the teachers teaching methodology.

Based on the findings of the research between learning styles and teaching methodology, it shows there is a significant relationship between the three styles of learning which are visual, auditory and kinesthetic with the teachers teaching methodology.

Suggestions

From the results and findings that we had, there are several suggestions in order to increase the effetiveness of learning and teaching prosess and also to optimize students learning style. The suggestions that had been spotted for the people involved to take their actions are:

Visual learning style

Teachers are hoped to play their role to create interest among students to study using this learning style as the research find out this is the least interested style of learning. Teachers has to use a lot of visual equipments and aids to increase the interest to study using this learning style.

The school also has to prepare all the equipments dan visual aids in every classroom to help the teachers in their teaching. It is hoped the students will be interested in this learning style.
Parents play an important role to help students to use this learning style by having the needed facilities and visual equipments such as computer, television and others.

Auditory learning style

Teachers should plan more story telling activities as a learning tools because students tend to learn more through this method. Facilities such as tape recorder, radio and computer must be provided for students to gain this learning style.
The school has to provide the needed equipment in order to increase students interest for this learning style.

Kinesthetic learning style

Students practise this learning style through practical activities carried out by the teachers. Therefore, teachers have to teach their students through practical activities so that this learning style can be practised by the students.

The needed equipment and aids to carry out the practical must be provided by the school so that students can study well through kinesthetic learning style. This learning style involves a lot of students movement. Therefore the needed equipment and facilities for the students to carry out the activity during their learning process must be sufficient.

Lecture teaching methodology

Students must be given every opportunity and encouragement to critises, giving suggestions and asking questions to teachers involving their teaching.
This is to improve teachers teaching methodology especially lecture method which is less interested by the students.

Teachers can increase the students interest of learning through this method by telling stories in classroom. Teachers

can also do jokes in their teachings so that students will not feel bored.

The Ministry of Education has to choose future teachers who have high confidence and were able to teach different types of teaching methodology. It will increase the students learning quality and schools' excellency.

Demostration teaching methodology

Teachers has to use multiple methodology during teaching and learning process because students are more interested in learning through this method. Facilities and equipments must be sufficient so that it will be easier for the learning and teaching process to take place.

The school has to check the teaching equipment in the classroom, laboratory and workshop regularly. This is to make sure the facilities and equipments are funtioning well and if there are any malfunction the school has to quickly repair them so that the teaching process will go on smoothly.

Conclusion

The result of the research can be used by the teachers as to improve their teachings so they could carry out their learning and teaching more effectively. The research also could make the teachers realized there are different styles of learning within students. Through this knowledge of learning styles, the teacher could plan an effective learning style for their students.

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Table 1 : The respondents data according to achievement level in CES(Civil Engineering School) subjects

Level	Number	Percentage
Low	19	10.6
Moderate	114	63.3
High	47	26.1
Total	180	100

Table 2 : The respondents data according to visual learning style(n=180)

Level	Number	Percentage
Low	4	2.2
Moderate	123	68.3
High	53	29.4
Total	180	100

Table 3 : The respondents data according to auditory learning style(n=180)

Level	Number	Percentage
Low	0	0
Moderate	48	26.7
High	132	73.3
Total	180	100

Table 4 : The respondants data according to kinesthetic learning style.(n=180)

Level	Number	Percentage
Low	0	0
Moderate	65	36.1
High	115	63.9
Total	180	100

Table 5 : The respondents data according to lecture teaching methodology (n=180)

Level	Number	Percentage
Low	0	0
Moderate	110	61.1
High	70	38.9
Total	180	100

Table 6 : Level and mean for every item

Subject	Overall Mean	Level
Visual Learning Style	3.44	Moderate
Auditory Learning Style	3.94	High
Kinesthetic Learnign Style	3.92	High
Lecture Teaching Methodology	3.63	Moderate
Demostration Teaching Methodology	4.31	High

Table 7: Analysis of the relationship between visual learning style and the achievement in Civil Engineering School subjects

Achievement is Civil Engineering School subjects	Significant	Pearson, r
Visual Learning Style	0.815	0.018

** Significant level   = 0.05 (2-tailed)

Table 8 : The correlation analysis between auditori learning style with the achievement of Civil Engineering School subjects.

Achievement is Civil Engineering School subjects	Significant	Pearson, r
Auditory learning style	0.002	0.226**

** Significant level = 0.05 (2-tailed)

Table 9: The analysis of correlation relationship between kinesthetic learning styles with the achievement of Civil Engineering School subjects

Achievement is Civil Engineering School subjects	Significant	Pearson, r
Kinesthetic learning style	0.266	0.083

** Significant level = 0.05 (2-tailed)

Table 10: The analysis of correlation relationship between lecture methodologies with the achievement of Civil Engineering School subjects

Achievement is Civil Engineering School subjects	Significant	Pearson, r
Lecture Teaching Methodology	0.183	0.100

** Significant level = 0.05 (2-tailed)

Table 11: The analysis of correlation relationship between demonstration teaching methodologies with the achievement of Civil Engineering School subjects

Achievement is Civil Engineering School subjects	Significant	Pearson, r
Demostration Teaching Methodology	0.886	0.011

** Significant level = 0.05 (2-tailed)

Table 12: The correlation relationship between visual learning style and teachers teaching methodology

Teachers' Teaching Methodology	Significant	Pearson, r
Visual Learning Style	0.000	0.491**

** Signifcant level = 0.05 (2-tailed)

Table 13: The correlation relationship analysis between auditory learning style and teachers teaching methodology

Teachers' Teaching Methodology	Significant	Pearson, r
Auditory Learning Style	0.000	0.283**

** Significant level = 0.05 (2-tailed)

Table 14: The correlation relationship analysis between kinesthetic learning style and teachers teaching methodology

Teachers' Methodology	Significant	Pearson, r
Kinesthetic Learning Style	0.000	0.415**

** Significant level = 0.05 (2-tailed)