# Cultural Learning Environment and Perception of Structural Engineering Classes in Qassim University

TOMAS UCOL-GANIRON JR
Department Of Architecture, Planning and Design
Qassim University
Buraidah
KSA
tomas@qec.edu

*Abstract:* -. This study aimed to determine the learning environment variables related to students interest and perceived competencies of 190 students in Qassim University during the First and Second semester of school year 2011-2012. The study made use of the standardized Cultural Learning Environment (CLEQ) Questionnaire (Fisher and Waldrip, 1998) to determine the cultural factors comprising the classroom learning environment in Structural Engineering courses as perceived by the Architecture & Civil Engineering students. The students' level of interest and perceived competencies in Structural Engineering courses were measured by adapting the Perception of Engineering Classes Survey (PECS) Questionnaire (Molina, 2011). Some interesting insight of the study are: 1). Students are more likely to collaborate, challenge their teachers, use modeling in learning Structural Engineering courses, and perceive what they learn in the class as matching their learning at home ; 2). Students have a generally low level of interest and perceived competencies in Structural Engineering courses; 3). There is a significant relationship between collaboration and congruence factors and perceived competencies in Structural Engineering courses.

*Key-Words:* - engineering education; cultural learning environment; structural engineering; classroom learning; architecture

## 1 Introduction

The classroom is a learning environment of a group of learners from different family background, practices, cultures and norms. It caters to students coming from numerous communities and regions with widely different cultural practices. Culture is defined as the distinct of life of a group of people, their complete design for living. It is their norms, values, beliefs, expectations, actions, and emotional reactions wherever they may be even inside the classroom. With this, classroom is considered as to be multicultural group of learners.

At most times, however, the teaching and learning strategies used in a classroom can be considered as being conflict with the natural learning strategies of the learner. Teachers, not purposely, can use classroom practices that may have conflict with students' previous learning patterns, norms, values and even regional cultures.

The teacher's responsibility is not only to teach, but also to create and set the class in atmosphere conductive to learning. Out of the enthusiasm of the teacher, better interaction takes place, which is to the advantage of the learners. Teaching enthusiasm is important even in college students who frequently stress it in explaining why they like certain professors and instructors and do not like others.

Teaching effectiveness depends on the ability of the teacher to create an interactive learning especially in structural engineering courses , which involves the structural design and structural analysis of buildings, bridges, towers, flyovers, tunnels and off shore structures.

Engineering and Architecture are embedded in, and influenced by, society and culture [1]. Even though engineering and architecture are viewed as a cultural artefact, still educational institution encounters the conventional teaching learning problems in the classroom.

Moreover, there is an increasing need, especially for engineering and architecture educators to be sensitive in the important cultural milieu into which their teaching is placed [2].

In particular, structural engineering is considered the professional course in Civil Engineering. It is considered as one of the foundation course in Architecture that needs a deeper research to determine the improvement needed in digging the student's potential. Not a few students prefer to pursue the non-engineering courses because of the difficulties they encounter in studying structural engineering.

The aimed of this study is to assess the cultural factors that affect the architecture and civil engineering students' level of interest and perceived competencies in structural engineering. Awareness of each factor will guide the structural engineering lecturers and professors in their continuous search for effective teaching.

# 2 Literature Review

## 2.1 Cultural Learning Environment

The relationship between cultural learning environment factors with student interest and perceived competencies in Engineering is basically premised on Bandura's Social Cognitive Theory, which underscores the reciprocal nature of influence among personal, behavioral and environmental factors in learning [3]. The behavioral and personal factor interaction can be exemplified with perceived self-efficacy, or beliefs concerning a person's competencies or capabilities to perform actions at designated levels [3].

Social cognitive theory also sheds light on the nature of student interest by distinguishing learning from performance of previously learned actions. People learn much of observing models, but the knowledge and skills they acquire may not be demonstrated at the time of learning unless they are motivated to display them. The motivation to perform previously learned skills may stem from the belief that the skills are appropriate in the situation and that the consequences will be positive.

The cultural learning environment was described in terms of (6) dimensions, namely: (1) collaboration; (2) deference; (3) competition; (4) teacher authority; (5) modeling; and (6) congruence [17]. Some teacher did away with the usual chalk lecture, but instead, provided varied opportunities for the students to come up with their own meaning of concepts. Interactive teaching was used where the teacher acted as facilitator using various attention catching starters [18]. This prompted the students to give their opinion and to ask high level questions.

In the study of Templeton aimed at assessing the school environment of an urban school to illuminate what teachers felt to be important factors in developing a safer school environment [4]. Responses to the School Level Environment Questionnaire (SLEQ) suggested that teachers wanted more student support, more resources and less work pressure in their learning environment [4]. To decrease work pressure, teachers adopted the work conservation strategies of working without reserves of time and energy [4].

The three general categories that can be used in characterizing diversified learning environment. These are: relationship dimensions, personal development dimensions and system maintenance and system change dimensions [5]. This finding emerged from Moos' work in a variety of environments including hospital wards, school classrooms, prisons, military companies, university residences and work milieus [5]. In the past 25 years, Moos' work has influenced the development and use of instruments to assess the qualities of the classroom learning environment from the perspective of the students [5].

Majority of the teacher felt that workshops are indisputable to make a high school Building Technology course success [6]. The study revealed factors that were significantly related to satisfaction in high school Building Technology class [6]. For example, satisfaction was positively related to achievement gains, greater participation in workshops and of course grades [6]. However, it was not determined whether these factors were the causes or the effect of being satisfied in the Building Technology course. The study showed that there was a negative relation between satisfaction and perceived difficulty, and it is not what students expect to happen that leads to satisfaction but what actually does happen [6].

There was a survey on students' attitudes to Engineering Mechanics, which focused on students who were not taking Engineering Mechanics as their major subject of study [7]. Findings recorded that the students found Engineering Mechanics to be moderately enjoyable and moderately interesting because of the poor teaching methods, not because of the subject itself [7].

Taylor assessed attitudes towards engineering teachers and students [8]. Science has had a reputation as a different and sophisticated course of study, which has intimidated the less able students, and those who felt less able [8]. It was evident that the subject matter of Science must be brought closer to the mainstream of student life and not exists solely in the mainstream of scientific endeavor [8]. According to the author, everyone individual possesses a set of attitudes [8]. Many of these attitudes arise from upbringing and deep-seated cultural influences [8]. They may include personal morality or political stance. Attitudes such as this may be regarded as they have never been worked out logically, but they are never the less strongly held, and they have to protect as from the many cognitive and affective inputs which we constantly received [8]. The question they used were open-ended and designed to reveal feeling about 1) Attitude towards science and school; 2) Instructional techniques; 3) The nature of science and scientific work; and 4) Academic and career goals in science [8]. Three things emerged from the study:

instructional strategies, cognitive demands and students ideas about how science should be taught [8]. The result of the study showed that children began on liking science.

The effectiveness of the teacher, which is the very foundation of the teaching-learning process in the classroom, has been given various definitions and implied meaning [19]. The teacher's effects in the realization of some values are usually the attainment of some educational objective in terms of student behaviors, abilities, habits, or characteristics [19]. Aside from knowing that classroom is a gathering of students with different values, practices, norms, and culture that adapted from their families, communities or region and in their classes since they started their formal schooling [19]. The teacher must be innovative enough in adapting various techniques to become effective.

Moreover, teacher is entrusted with the major responsibility of making the classroom an effective learning environment [20]. They asserted that the teacher, in order to prove his effectiveness in teaching, should have objective measures of student learning [20]. The objective teacher is one who attempts to use the effectiveness of his teaching skills not subjectively but by objectively [20]. He is not afraid to innovate or to modify existing methods. He uses methods, which objectively promote the greatest degree of learning, and disregard those, which are less effective. In other words, the teacher believes that in order to become effective, he must be genuinely interested in making the classroom a successful learning environment.

## 2.2 Student Interest and Perceived Competencies

There was powerful evidence that students' attitude towards engineering is linked to a perception of self and ability to learn [21]. The researcher believed that in parallel with the intellective factors affecting the achievement in Structural Engineering, the non-intellectual factors also play an important role in it. It appeared that students with a strong positive regard for their own abilities to learn have more than positive attitude toward engineering. Family upbringing was also pointed out as a strong influence on the attitude of the students especially in their study. It influences their study habits, their value to the education and their responses for every circumstance they experienced.

Daleon found out that there was a significant relationship between academic performance in Physics and personality, socio-economic status, interest in science, time allotted in studying Physics, home adjustment, health adjustment, submissiveness and emotionality "unpublished" [11].

According to Kremen that home environment variables were related to student learning outcomes [9]. Based on the result of the studies indicate that high parent involvement was related to high school science attitudes and interest among the students [9]. Home environment and parent education exerted a strong influence with a caused chain linking instruction with attitude and achievement [10].

Tubera found out that there was a significant relationship between academic performance in Strength of Materials course and personality, socio-economic status, interest in engineering, time allotted in studying Strength of Materials course, home adjustment, health adjustment, submissiveness and emotionality [12]. It was also found out that there was no significant relationship between academic performance in Strength of Materials course and birth position in the family, number of siblings in the family and pressure of parents at home [12]. He recommend to explore the possibility of including personality test, adjustment test, questioning in socio-economic status and interest in engineering in giving entrance exam to potential students that will major in Civil Engineering or take courses that need more Structural Engineering courses [12].

Figuerres found out that Physics achievement was positively and significantly correlated with home adjustment "unpublished" [13]. It was negatively and significantly correlated with factor Q. (conservation vs. experimenting), this means that conservative students tend to be high achievers in Physics [13]. However, personality factors as health adjustment, Factor I (tough-minded vs. tender-minded), Factor M (practical vs. imagination), Factor O (self-assertion vs. apprehension), and Factor Q2 (group-dependent vs. self-sufficient) were not significantly related to Physics achievement [13].

The study of Reyes in selected colleges and universities in Luzon, found that Chemistry achievement of the study group is not significantly related to: home environment, type of parents and number of experiments actually performed in the laboratory [14]. However, it is correlated significantly with; College Chemistry grade, high school Chemistry grade, fourth year high school grade point average, and number of units earned in College Chemistry [14].

Simpson's study of attitude toward science and achievement in science, demonstrated that affective behavior in science classroom are strongly related to achievement [15].

Furthermore, Manalasal in his study on the Physics Achievements of Muslim and Christian students in North Cotabato, found out that the

Muslim respondents are better achievers in College Physics than the Christian respondents "unpublished" [16]. The most likely factors that influence the Muslim sample achieved higher are; age and scholarship [16]. Students having scholarship grant are highly motivated [16]. Older students are better able to analyze and think critically about solution of problems in Physics [16]. Furthermore, the Muslim and Christian samples whose parents had no formal education were the same achievers in College Physics, whereas the Muslim samples whose fathers had formal education were better achievers than their Christian counterparts [16]. For those whose mothers had formal education, the Muslim samples were better achievers than the Christians [16]

There was a case study made on the College Scholastic performance of 597 students of Central Mindanao University from 1969-1973 [22]. The findings showed that high school performance did not seem to be associated with college performance and the kind of high schools where the student graduated from may have some degree of influence on the student drop in the students' grade in college. The different types of high schools tend to be significantly associated with scholastic performance of the students in college [22]. Some of the possible reasons cited in the study were lack of instructional facilities and inadequate training of vocational teacher in vocational high school [22].

## 3 Research Design

The study made use of both descriptive and inferential research method with questionnaires as the main data-gathering instrument. The study made use of universal sampling or complete enumeration of the 190 students taking up structural engineering courses in Qassim University, Buraidah during the school year 2011-2012. The distribution of the respondents according to courses is presented in Table 1.

A total of 29 Architecture students were enrolled in Structural Design and 161 Civil Engineering students were taking up Structural engineering courses.

| Courses | Frequency | Percent |
|---|---|---|
| Mechanics of Materials | 35 | 18.4 |
| Structural Materials | 33 | 17.4 |
| Structural Design for Architecture 1 | 29 | 15.2 |
| Structural Analysis | 31 | 16.3 |
| Reinforced Concrete | 32 | 16.8 |
| Steel Structure & Design | 30 | 15.7 |

Table 1: Frequency and Percent Distribution of Structural Engineering Courses

## 4 Instrumentation

The instruments used by the researcher to assess the students' cultural learning environment in Structural Engineering courses were the Cultural Learning Environment Questionnaire (CLEQ) developed by Fisher and Waldrip [22]. On the other hand, in order to assess the students' level of interest and perceived competencies in Structural Engineering were taken from Perception of Engineering Classes Survey (PECS) Questionnaire developed by Molina [23].

The 35 item CLEQ that contains the six scales such as Collaboration, Competition, Deference, Teacher Authority, Modeling and Congruence [22].

Collaboration scale measures the extent to which students are part of a strong cohesive group. It assesses the feeling of the students on the importance to work together as a group in the class. The deference scale measures the extent to which students provided their own opinions or deferred to others. The Competition scale measures the degree to which the students are competitive with each other. Furthermore, it assesses the degree of likeliness to compete against other students.

The teacher authority scale determines the extent to which students perceive that the teacher has authority in the classroom. One of the weighing scales is the feeling of the students that they can challenge or disagree with their structural engineering teacher. While modeling scale looks for the extent to which the students prefer to learn by a process of modeling, it also measures the desire of the students to let the teacher show them what to do.

For the Congruence scale, it measures the degree to which the students feel that learning at school matches they're learning at home. This item wants to know if what the students learn in the classroom is what they need at home.

The PECS was used to assess the perception of students about their level of interest and perceived competencies in their structural engineering classes [23].

The final draft of the questionnaires was pretested by an initial group of 8 prospective respondents and their comments and suggestions were incorporated in the final draft [24]. The initial group however, was not included on the respondent group whom the final questionnaire was administered.

Each item of the CLEQ questionnaires was responded to a five-point scale with the extreme alternatives of Disagree-Agree. Students were asked to indicate to what extent they agreed that each item described their structural engineering classroom.

# 5 Results and Discussion

## 5.1 Cultural Learning Environment

| Indicator | Weighted Mean | Standard Deviation | Interpretation | Rank |
|---|---|---|---|---|
| 1. Collaboration | 4.02 | 0.62 | Often | 1 |
| 2. Deference | 3.73 | 0.55 | Often | 2 |
| 3. Competition | 3.59 | 0.69 | Often | 5 |
| 4. Teaching Authority | 3.96 | 0.54 | Often | 3 |
| 5. Modeling | 3.77 | 0.52 | Often | 4 |
| 6. Congruence | 3.77 | 0.58 | Often | 4 |

Table 2: Students' Perceived Extent of Cultural Environmental Factors

The students' overall scores in the six scales of the CLEQ are presented in Table 2. The relatively high perception of the respondents on Teacher Authority implies that Modeling is the next perceived as present in the respondent class. The respondents perceived that imitating what the teacher and classmate does and say is more preferable to them. The students' perceived extent of Congruence in their Structural Engineering class was one of the same with Modeling.

The respondents perceived that what they learn in their structural engineering class helps them in doing things at home and vice versa.

On the other hand, the relatively low overall weighted mean score for Deference describes the Structural Engineering courses in terms of relationship as somewhat avoidant. The respondents tend to give importance on providing right answers once they will be given question by their teachers. But they would rather listen first to the answer of their classmate before giving their answer.

The lowest overall weighted mean which was obtained for competition describes Structural Engineering classes as more collaborate than competitive, preferring to develop and adopt cooperative strategies within the classroom.

The extent of Architecture and Civil Engineering students' interest in Structural Engineering Courses are presented in Table 3

| Indicator | | Weighted Mean | Standard Deviation | Interpretation | Rank |
|---|---|---|---|---|---|
| **1** | **STUDENT INTEREST** | 4.04 | 0.45 | Agree a little | 2 |
| 1.1 | I enjoyed the laboratory activities from the class | 4.85 | 0.42 | Agree | 4 |
| 1.2 | I enjoyed this structural engineering class | 4.95 | 0.94 | Agree | 3 |
| 1.3 | I would have taken this class even if I was not required. | 3.82 | 1.49 | Agree a little | 7 |
| 1.4 | I felt comfortable in this class. | 2.57 | 1.30 | Disagree a little | 8 |
| 1.5 | This class has increased my appreciation for structural engineering. | 4.98 | 0.83 | Agree | 2 |
| 1.6 | This class has increased my interest in structural engineering. | 5.08 | 0.74 | Agree | 1 |
| 1.7 | I am interested in pursuing a structural engineering career. | 4.38 | 0.91 | Agree a little | 6 |
| 1.8 | This class was not dry and boring. | 2.47 | 1.40 | Disagree a little | 9 |
| 1.9 | I am still excited learning more about structural engineering. | 4.69 | 1.19 | Agree | 5 |
| 1.10 | Structural engineering has a lot to do with my life. | 2.44 | 1.57 | Disagree | 10 |

Table 3: Extent of Students' Interest in Structural Engineering Courses

Of the ten indicators of student interest, five obtained weighted mean values which showed that the students were agreeable to it or that they were interesting in Structural Engineering courses. Specifically, the architecture and civil engineering students expressed that their Structural Engineering class increased their interest in structural engineering, registering the highest weighted mean value of 5.08. It made them appreciate structural engineering all the more (4.98). They enjoyed their Structural Engineering class (4.95), particularly the laboratories activities (4.85). In fact, they reported being still excited about learning more about Structural Engineering Courses (4.69).

In terms, however of whether or not they were interested in pursuing a structural engineering-related career, the architecture and civil engineering students only agreed a little (4.38). When asked, if they would take the Structural Engineering class even if they were not required, the respondents agreed a little (3.82). A marked variation in how they feel about the matter could be seen from its relatively large standard deviation score of 1.49. This denotes that the majority to the responses to this particular item varied from a range of scores of 3.61 to 5.09, meaning that most of the students were between disagreed to agree to taking the Structural Engineering class even as a personal option.

The Architecture and Civil Engineering students disagreed a little that they felt comfortable in their Structural engineering class (2.57). In particular, they were a little disagreeable to saying that their class was not dry and boring (2.47) and that it had a lot to do with their life (2.44).

Overall, the respondents registered a grand weighted mean value of 4.04, signifying that the majority of the Architecture and Civil engineering students agreed a little to the aforecited indicators of student interest. This may be taken to mean that they were on the average a little or slightly interested in their Structural Engineering courses.

## 5.2 Perceived Competencies in Structural Engineering Courses

As seen from the data in table 4, the respondents agreed a little that they had a good understanding of basic structural engineering concepts (4.49). they more or less agreed that their high school Building Technology classes have adequately prepared them for their Structural Engineering classes have adequately prepared them for their structural engineering class (4.29) and that they know enough engineering to understand the information presented in their Structural Engineering class (4.29).

Based on the overall grand weighted mean of 4.35, equivalent to “agree a little,” majority of the respondents perceived themselves as a little bit competent in structural engineering courses. The grand standard deviation value of 0.74 locates the bulk of the respondents’ responses within the range from 3.61 to 5.09 or from "agreed a little” to “agreed.” This may be translated to mean that they generally perceived themselves as a little bit competent in Structural Engineering.

| Indicator | | Weighted Mean | Standard Deviation | Interpretation | Rank |
|---|---|---|---|---|---|
| 2 | **PERCEIVED COMPETENCIES IN STRUCTURAL ENGINEERING** | 4.35 | 0.74 | Agree a little | 1 |
| 2.1 | I have good understanding of basic concepts in structural engineering | 4.49 | 0.83 | Agree a little | 1 |
| 2.2 | I know enough engineering to understand the information presented in this structural engineering class. | 4.29 | 1.06 | Agree a little | 2 |
| 2.3 | My high school building technology classes adequately prepared me for this structural engineering class | 4.29 | 1.01 | Agree a little | 2 |

Table 4: Extent of Students’ Perceived Competencies in Structural Engineering Courses

The respondents’ failing to agree fully to the statements like “ having a good understanding of the basic Structural Engineering concepts” implies that Architecture and Civil Engineering students felt they were not strong in their basic or foundational knowledge of Structural Engineering courses. Similarly, there were a number of students who were not so sure if their high school Building Technology classes have prepared them enough to hurdle the challenges of Structural Engineering. This underscores the importance of beginning Structural Engineering lessons with a short review of prerequisites knowledge as well as a clear statement of goals for each topic. Since a substantial number of students also felt they did not know enough engineering to understand the information presented in their Structural Engineering class, new materials or topics need to be presented in smaller steps or doses, with more practice or seatwork after each step or topic. This also highlighted the value of asking questions to check for student understanding along the way.

### 5.3 Relationship between Cultural Learning Environment Factors and Students' Interest and Perceived Competencies in Structural Engineering

The relationship between cultural environmental factors and Architecture and Civil Engineering students' interests and perceived competencies in Structural Engineering was examined in this study. Since the data for the different dimensions of the respondents' cultural environment and the students' level of interest and perceived competencies were interval data, a parametric test of significance of relationship was applied in this study. This was the Pearson Product Moment Correlation technique as denoted by the r-coefficient.

| Cultural Environmental Factors | Students' Interest | | | Perceived Interest | | |
|---|---|---|---|---|---|---|
| | Computed (r) | Associated Probability | Interpretation | Computed (r) | Associated Probability | Interpretation |
| 1. Collaboration | 0.053 | 0.494 | Low Correlation | 0.304 | 0.000 | Moderate Correlation |
| 2. Deference | 0.362 | 0.000 | Moderate Correlation | 0.179 | 0.020 | Low Correlation |
| 3. Competition | 0.242 | 0.002 | Low Correlation | 0.111 | 0.149 | Low Correlation |
| 4.Teacher Authority | 0.208 | 0.007 | Low Correlation | -0.0604 | 0.408 | Low Correlation |
| 5. Modeling | 0.453 | 0.000 | Moderate Correlation | 0.101 | 0.193 | Low Correlation |
| 6. Congruence | 0.252 | 0.001 | Moderate Correlation | 0.282 | 0.000 | Moderate Correlation |

Table 4: Correlation between Cultural Environmental Factors and Students' Interest and Perceived Competencies in Structural Engineering Courses

#### 5.3.1 Student Interest

As maybe observed from the data in table 4, almost all the different cultural environmental factors, except for collaboration, yielded computed r-coefficients which had associated probabilities that were much less than the set 0.05 level of significance and were even significant at the 0.01 level. Thus, it may be inferred that there was a highly significant relationship between the students' level of interest and the following cultural environmental factors: (1) modeling; (2) deference; (3) congruence; (4) competition; and (5) teacher authority. Therefore, the hypothesis that there was significant relationship between the different dimensions of cultural learning environment and the students' level of interest in Structural Engineering was accepted, except in terms of collaboration.

As the sign of the correlation coefficient of five other factors would suggest, there exists of a positive or direct relationship between the said variables and the students' level of interest in Structural Engineering. That is, the more these cultural environment factors were felt or perceived as present by the students, the more they tend to be interested to learn Structural Engineering courses and vice versa.

##### 5.3.1.1 Deference and Student Interest

The highly significant positive relationship between these two variables may be partly accounted for by the fact that when deference is high, for instance, when it is important for the students to be able to give the right answers to question in class, they would tend to study more. They would also be more interested to listen to what the teacher and other student say before giving their own answer, which may be taken to mean that they think more critically.

##### 5.3.1.2 Teacher Authority and Student Interest

The results of the study showed that there was a highly significant positive relationship between these two variables. The more assured are the students that it is okay to question or disagree with their teachers' ideas., the free they will be in thinking for themselves and forming their own opinions [25].

#### 5.3.1.3 Modeling and Student Interest

The highly significant and direct relationship between these factors suggest that students who appreciate more the examples and explanations of the teachers and even the ideas of their classmates.

#### 5.3.1.4 Congruence and Student Interest

Students who see more relationship between what they learn in Structural Engineering within and outside the classroom would likely feel more interested in learning structural engineering. Students see its practical value of knowledge in structural engineering in their daily life. This would feel them more enthusiastic in learning the courses.

### 5.3.2 Perceived Competencies

As maybe gleaned from the data in table 4, only three cultural learning dimensions were either significantly correlated or highly significantly correlated with the students' perceived competencies in Structural Engineering. The factors that were highly significant correlates of perceived competencies were: collaboration (r=0.304); and congruence (r=0.282). These had associated probabilities that were less than the 0.01 level of significance. On the other hand, deference was found to be a significant correlate of the students" perceived competencies in Structural engineering (r=0.179). Its correlation was significant at the 0.05 level.

As the sign of the correlation coefficients of the said three (3) factors would suggest, there exists a positive or direct relationship between the said variables and students' perceived competencies in Structural Engineering. This implies that these cultural environment factors were felt or perceived as present by the students, the more they tend to have a higher level of perceived competencies in the courses.

#### 5.3.2.1 Collaboration & Perceived Competencies

There appears to be a highly significant and positive relationship between these the highly significant positive relationship between these two variables. This means that those students who tend to work more with other students were the ones who became more competent in Structural Engineering.

This also implies that working in groups seems to be more effective mode of learning Structural Engineering.

prefer more the modeling technique in learning Structural engineering tend to show more interest in the courses. They are the ones who are able to

#### 5.3.2.2 Congruence & Perceived Competencies

The students who felt that what they learned in Structural Engineering help them at home or helped them understand how things work in their daily life tend to be more competent in the courses [25]. This could be because of their higher level of interest to learn Structural Engineering.

## 6. Findings

These results indicate that the teacher has a lot of considerations in making their Structural Engineering Courses interesting to the students. Like in modeling factor, it seems that the interest of the students may be enhances by using objects, set-ups or multimedia in presenting and explaining the concepts of the said courses.

Another, discussion of Structural Engineering principles with its practical applications (congruence) appears to make the students feel eager in learning the courses. Hence, it can make the students see the importance of learning the courses.

Additionally, showing to the students the enthusiasm in teaching could also another form of motivational factor to the learner. The teacher should always have the excitement of presenting the lesson. This is only possible by continuous updating of teacher to their lesson. Attending seminars, upgrading reference materials and graduate studies can provide this thrill to the teachers.

Moreover, having an assurance that the teacher freely allows the students to clarify the lesson presented during discussion (teacher authority) may also help increase the interest in the courses [26]. It seems that two-way discussion or open communication will enable the students to have deeper interest in the courses. A pleasant character of the teacher could provide the means of accomplishing this factor.

Providing an effective rivalry among the students or even to themselves can also make them responsive in Structural Engineering. Including in the lesson preparation a healthy competition as part of student's performance evaluation can do this [27].

In addition, the yielding in opinion, judgment and evaluation of students in their Structural Engineering class can possibly makes the courses interesting to them. Probably, the student prepares more to listen to the opinion of their classmates and It just shows that it is important to gather first information through opinions just like in the scientific method. It is maybe because majorities of the respondents are taking up technical courses.

The findings of the study also identifies that there are only three among the six environment factors included in the research have the significant correlation with the perceived competencies of the students in Structural Engineering. They were collaboration, congruence and deference. Looking at the results of findings in the student interest, the two cultural factors except collaboration have a positive and significant correlation with student interest. This could be because a motivated student can perceive a higher competency in the courses.

Moreover, even though collaboration is not significantly correlated in students' in Structural Engineering but it can contribute in increasing the competence of the students in Structural Engineering courses. Maybe the students can understand easily the concepts in Structural Engineering by working in a group like laboratory. Civil Engineering teachers like in Structural Engineering Courses may reinforce group activities to enhance the learning in the said courses

## 6. Conclusion

Civil Engineering and Architecture Students were more likely to collaborate, challenge their teachers, use Modeling in learning Structural Engineering courses, and perceive what they learn in class as matching their learning at home. There were significant relationship between the different dimensions of cultural learning environment and the students' level of interest in Structural Engineering, except in terms of collaboration. Another, there was a significant relationship between the different cultural environment factors such as collaboration and congruence and perceived competencies in Structural Engineering Courses.

The collaborative approach like working in groups should be applied more in teaching Structural Engineering courses while making sure has important concepts are clearly explained and given relevant and useful illustrative examples.

The Architecture and Civil Engineering students' level of enthusiasm in learning Structural Engineering courses should be enhanced by highlighting its importance and direct relevance to the student practical life.

Efforts should be exerted by the Civil Engineering teachers to make Structural Engineering concept interesting and more easily understandable. teachers.

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