DEMOCRATIC CLASSROOM AND STUDENT COMMUNICATION SKILLS DEVELOPMENT OF MECHANICAL ENGINEERING EDUCATION

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ABSTRACT

This paper examined the effect of democratic classroom environment towards the communication skills of engineering students in mechanical engineering field in Pakistani context. Using an attitudinal questionnaire, this study examined 80 male and female students’ perceptions from two different engineering colleges. A Chi-square test was applied to ascertain the degree of difference between their perceptions. The results showed that there was no significant difference in the perceptions of male versus female engineering students regarding the role of democratic classroom. Thus, it was concluded that democratic classroom environment promoted communication skills of students irrespective of gender difference in mechanical engineering education.

Keywords: Democratic Classroom, Communications Skills, Mechanical Engineering, Students’ Perceptions.

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1. INTRODUCTION

Classroom environment has great importance in the academic life of students. It should not be considered a place where only knowledge is disseminated to the learners rather it is a place where the personality of the child is developed and habits are formed. It is a place where a child finds new opportunities for social, moral, intellectual and physical development (Inran, 2006). According to Feinberg and Toress (2001), a teacher can play an important role in creating a caring and supportive classroom environment. There are different classroom environments such as teacher-centered classroom and student-centered classroom. In the
former one that is also known as traditional classroom, the teacher speaks and the students listen. Students do not have the liberty to act without obtaining the teacher’s permission first. Mulji (2004) stated that in traditional classrooms students are passive and not active participants in the teaching and learning process. Students in democratic class are free to ask questions, act independently and interact without teacher domination. The teacher merely guides and monitors them (Crawford, 2003; Cushman, 1994).

Progressive educationists such as Dewey and Rousseau also supported the idea that educational curriculum should aim at developing different abilities, interests and skills of the students. Learners should get equal opportunities for their educational development. This could be achieved by providing them with an educational environment where they will participate as active learners and not passive listeners (Quinn, Challahan, & Switzer, 1999; &Oakes, 2005). In this way, meaningful communication will take place that accentuates effective learning process. Haynes and Chaltain (2004) supported these views that teachers can create classroom environments where the learners are able to master important skills such as cooperation, trust and respect as well as tolerance towards their classmates. Merely getting bookish knowledge is not enough for successful students. They should also demonstrate the learnt behaviors in their daily lives. Siddiqi (2002) asserted that one of the objectives of education is to develop children into good human beings and valuable thinking citizens.

Children should be exposed to an environment at schools that facilitates their social development, skill enhancement and personality development. This can be possible by providing them an educational environment where they can learn, act and participate as equal customer of education and also contribute to the teaching and learning process. Shahid (2000) described that the aim of education should be to enable an individual to live as a useful member of the society. So in this democratic age, education should prepare individuals for democratic living. In order to achieve this aim of education, schools should not only transmit knowledge to students about democratic life but provide such an academic environment where the children feel supported and are able to apply the newly gained knowledge and skills appropriately. Patrick (2004) found that students learn better in a class environment that encourages free and open discussion among the teachers and students. Therefore, teachers should ensure that two-way communication takes place in their classrooms.

Lipton and Oakes (2003) stated that classroom is a miniature society. In classrooms, learners have different kinds of interactions with their classmates during the classroom activities that can affect their behaviors and attitudes in varying degrees. As a result, they can learn cooperation, trust and responsibility. Democratic classroom environment is a place where students share their thoughts, ideas and experiences with their classmates. Students consider the classroom to be a forum where they can share their thoughts freely and openly. In such classrooms, students are active learners. They can take decisions and are responsible for their own learning. The teacher merely guides them and monitors the students’ activities. A friendly and supportive classroom environment positively shapes students’ personality, because, in such a class, students get respect and care from the teachers and peers (Lipton & Oakes, 2003). On the contrary, in a non-democratic classroom, students merely listen to the instructions of the teacher. The students will not be able to share their views easily. Consequently, students become passive, inactive and quiet. This phenomenon is known as culture of silence (Faq, 2005, Shanon, 1991, Graham, 2004). Bafile (2005) found that in a safe and cooperative classroom environment, students find better opportunity to make choices and speak. Hence, they feel encouraged. This provides a rich ground where confident, self-directed and successful students evolve. Basically, these ideas emphasize on a caring and cooperative classroom atmosphere.
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The twentieth century progressive educational reformer Dewey (1938) also advocated democracy in education. Creating a classroom environment where students find wider opportunities for sharing their ideas, interacting with class fellows and taking decisions independently, adds to their confidence and strong self-efficacy (Noddings, 1998; Tse, 2000; Wamba, 2005; Webb, 2004). Besides, Bano (2005) highlighted that classroom environment should be based on diversity. Students must be provided with various activities to learn new knowledge and to practice what they have learnt. Teachers should be flexible and cooperative. This leads to the promotion of students’ creative skills such as critical thinking, reasoning, questioning, and reflection.

In a non-democratic classroom environment, the main sources of information for the students are only the textbook and the teacher. There are less interactive activities for students to share their experiences (Beck, 2001; Khurram, 2003; Stuen, 1995). Patrick (2004) informed that in non-democratic classrooms, knowledge is transmitted to students through lectures and textbooks. This situation is very commonly found in many classrooms in Pakistani context. Dean (2005) highlighted that the teaching and learning practices in many Pakistani schools are traditional and dreary. Teachers prefer to transmit textbook knowledge and ensure students memorize the points. Teachers do not seem to pay much attention in creating the classroom environment where students are able to participate as active learners in the process of teaching and learning. The textbook is considered to be the main source of knowledge or instrument of imparting knowledge. Teachers do not create an enabling classroom environment where students could freely interact, cooperate and share their own experiences. Rather, students are expected to rote learn what the book contains and reproduce it in examination.

The existing classroom environment in the schools has contributed to the socialization of obedient and passive citizens who lack critical thinking, questioning, decision making and problem solving skills (Metzger, 2004; Zajda, 2001, Dean, 2005). Mehmet (2006) argued that the aim of education is not to have students memorize information but rather it is to create socially and morally active members of the society. This goal can be achieved if schools provide learners with wider opportunities for socialization and development.

2. DEMOCRATIC CLASSROOM AND COMMUNICATION SKILLS

A caring and democratic classroom allows students to grow socially, intellectually and morally. In such classrooms students can freely and actively participate in the process of teaching and learning. Therefore, it is vital that teachers create a caring and supportive academic environment where students are able to express their capabilities and demonstrate their creativities freely without any fear (Feinberg & Toress, 2001; Hall & Barrett, 2000; Pryor, 2004). This situation develops the students’ communication skills and improves their socialization capacity. Studies support the view that teaching and learning is an interactive process which demands students’ active involvement in the learning process for the reconstruction of their knowledge and experiences.

Teaching should be based on interactions, discussions, dialogues, and cooperation (Fisher, 1994). Silence in the classroom does not promote creativity among students. Kunwar (2001) viewed that in a democratic classroom, teachers encourage the students to share their own ideas freely. In this case, the teacher acts as a moderator. In this way the learners construct knowledge by themselves. Mulji (2004) highlighted that relationship between the teacher and the students must be based on mutual love, care and shared responsibility. Teachers should create a caring atmosphere in order to build the confidence of the students to share their ideas. In this way, students can learn to be active learners. This makes the students feel encouraged in the learning process. They become worthy of helping others and sharing their ideas. Such
opportunities help students to test themselves and enhance their communication skills (Hall, 2000; Dash, 2004; Leenders & Veugelers, 2006; Selwyn, 2003).

Classroom should be a place where learners can have a strong sense of belongingness. The learners should be able to identify themselves with the culture of the classroom and feel safe in expressing their feelings. Moreover, students can learn better in an open classroom atmosphere, where open discussions are encouraged. In a democratic classroom, teachers should facilitate students to learn by providing sufficient guidance to them. This atmosphere of intellectual freedom will enable the students to express their ideas freely which is essential for development of communicative students (Imran, 2006; Bafile, 2005; Abbas, 2002). Thus, students would be able to communicate with each other and the teacher without the fear of being judged. In order to achieve this aim, schools are needed to promote a culture of sharing and cooperation.

3. RESEARCH OBJECTIVES
This study was conducted to achieve the following objectives:

- To examine the effect of democratic classroom environment in the communication skills of mechanical engineering students.
- To explore the difference in the perceptions of the mechanical engineering students about the effect of democratic classroom environment in communication skills.

Hypothesis

H₀: There is no significant difference in the perceptions of male versus female students regarding the effect of democratic classroom environment in communication skills.

4. METHODOLOGY

Population and Sampling
This quantitative study employed a causal comparative design. The population of this study included two groups of students from two mechanical engineering colleges in Peshawar. 40 male students and 40 female students were purposively sampled to be the respondents of the study. A purposive sample enables the researchers to generalize the results and it is the representation of the whole population from which it is selected (Gay, 1992). The engineering colleges were selected on the basis of geographical proximity.

Instrumentation

A self-administered questionnaire was designed to collect data. The researchers sought the experts’ opinions of three PhD professors of education department to ensure the validity of the items. For reliability check, the questionnaire was piloted among 30 students who were later excluded from the study. According to Gay and Airasian (2003), a pilot study is a worthwhile phase in the scientific research process. It helps in indicating the mistakes within the selected instruments by allowing testing on a small number of people. As a result of the pilot study, errors were rectified and refined. The consent of the participants was obtained prior to the data collection. In addition, the confidentiality and anonymity of the participants were fully ensured. The questionnaire was also coded to further ensure anonymity of the research participants (Bouma, 1996). For the data analysis different tests of significance were used such as the test of independent sample, non-independent sample and Chi-square (X). In this study, Chi-square was selected as the test of significance. It is two dimensional in nature and can clarify different categories. It was highly suitable for satisfactory analysis of nominal
data that the researchers obtained from this study. It was found to be very convenient for data analysis (Gay, 1992).

**Procedure for Testing Hypothesis**

In order to determine whether there was a significant or real difference between the two sample groups from the population, the researchers applied an appropriate test of significance (Gay & Airasian, 2003). Many tests of significance typically test null hypothesis. Similarly, this research hypothesis is also stated in null form. The tests of significance are always two-tailed. The null hypothesis states that there is no significant difference between the two groups but the two-tailed test allows the possibility that a difference may occur. Since the data collected is non-parametric and represents a nominal scale, therefore, the researchers used a non-parametric test of significance. As the researchers had two mutually exclusive categories of male and female groups, therefore, Chi-Square was selected as an appropriate test of significance. Chi-Square, symbolized as $\chi^2$, is a non-parametric test of significance appropriate when the data are in form of frequency counts or percentages and proportion that can be converted to frequencies. The frequencies are categorized not only in one dimension but also with more than one dimension, resulting in two-dimensional chi-square. The researchers statistically analyzed the hypothesis by applying a test of significance to the various perceptions of the respondents. Having received clarity gained from the test of significance between the levels of agreements of both male and female respondents, conclusions were obtained by the researchers regarding the formulated hypothesis (Kumar, 1996).

**Test of hypothesis**

$H_0$: There is no significant difference in the perceptions of male versus female mechanical engineering students about the effect of democratic classroom environment in the communication skills development. Table 1 shows the levels of agreement of the male and female students which highlight their perceptions in this regard.

<table>
<thead>
<tr>
<th>Category</th>
<th>High level of agreement</th>
<th>Low level of agreement</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>37</td>
<td>03</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>92.5%</td>
<td>7.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Female</td>
<td>36</td>
<td>04</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td>Column Total</td>
<td>73</td>
<td>07</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>91.25%</td>
<td>8.75%</td>
<td>100%</td>
</tr>
</tbody>
</table>

$\chi^2 = 0.157$ \hspace{0.5cm} $P > .05$ \hspace{0.5cm} df = 1

Figure 1 shows clearly that there is not much difference in the perceptions of the male and female engineering students. Since the calculated value of Chi Square 0.157 is less than the tabled value 3.841 at 0.05 level of significance and df = 1, therefore, the null hypothesis would not be rejected. Hence, it is accepted and it can be justified that there is no significance difference in the perceptions of male versus female students about the effect of democratic classroom environment in the communication skills of the students.
Democratic Classroom and Student Communication Skills Development of Mechanical Engineering Education

**Figure 1** The Chi-square test

The responses of the respondents have been ranked in table 2a and 2b to show the level of agreement or disagreement between the respondents to each statement. Table 2a shows the analysis of male respondents and Table 2b shows the analysis of the female respondents.

**Table 2a** Responses of male students about the effect of democratic classroom environment in the communication skills

<table>
<thead>
<tr>
<th>S. No</th>
<th>In a democratic classroom students are:</th>
<th>Rank</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>able to take part in classroom discussions.</td>
<td>4</td>
<td>33</td>
<td>04</td>
<td>03</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>82.5%</td>
<td>10%</td>
<td>7.5%</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>confident in presenting their ideas orally.</td>
<td>2</td>
<td>35</td>
<td>01</td>
<td>04</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>87.5%</td>
<td>2.5%</td>
<td>10%</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>reluctant to speak in front of others. *</td>
<td>6.5</td>
<td>03</td>
<td>05</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.5%</td>
<td>12.5%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>able to express themselves without any difficulty.</td>
<td>3</td>
<td>34</td>
<td>03</td>
<td>03</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85%</td>
<td>7.5%</td>
<td>7.5%</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>motivated to take part in class debates.</td>
<td>1</td>
<td>36</td>
<td>04</td>
<td>00</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>90%</td>
<td>2.5%</td>
<td>00%</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>fearful of speaking to their classmates. *</td>
<td>5</td>
<td>03</td>
<td>04</td>
<td>33</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.5%</td>
<td>10%</td>
<td>82%</td>
<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>hesitant to make a speech in front of others. *</td>
<td>6.5</td>
<td>04</td>
<td>04</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10%</td>
<td>10%</td>
<td>80%</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Indicates reverse statements

**Table 2b** Responses of the female students regarding the effects of democratic classroom environment in communication skills.

<table>
<thead>
<tr>
<th>S. No</th>
<th>In a democratic classroom students are:</th>
<th>Rank</th>
<th>Agree</th>
<th>Unsure</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>able to take part in classroom discussions.</td>
<td>2</td>
<td>34</td>
<td>04</td>
<td>02</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85%</td>
<td>10%</td>
<td>5%</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>confident in presenting their ideas orally.</td>
<td>5</td>
<td>31</td>
<td>07</td>
<td>02</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>77%</td>
<td>17.5%</td>
<td>5%</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>reluctant to speak in front of others. *</td>
<td>4</td>
<td>01</td>
<td>10</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.5%</td>
<td>25%</td>
<td>72.5%</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>able to express themselves without any difficulty.</td>
<td>7</td>
<td>35</td>
<td>03</td>
<td>02</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>87%</td>
<td>7.5%</td>
<td>5%</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>motivated to take part in class debates.</td>
<td>3.5</td>
<td>32</td>
<td>05</td>
<td>03</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80%</td>
<td>12.5%</td>
<td>7.5%</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>fearful of speaking to their classmates. *</td>
<td>6</td>
<td>02</td>
<td>08</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5%</td>
<td>20%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>hesitant to make a speech in front of others. *</td>
<td>3.5</td>
<td>02</td>
<td>06</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5%</td>
<td>15%</td>
<td>80%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Tables 2a and 2b indicate that for item 1, 82% male and 85% of female students have agreed that democratic classroom environment does contribute to the enhancement of their
communication skills. It is evident from their opinions that they have strongly agreed to the positive statements that students in democratic classroom environment are able to take part in classroom discussions and that they are motivated to participate in debates in the class. For item 2, 77 % female and 87% male students have agreed that in such a class students are more confident to share their ideas orally. It does not show any significant difference in their opinions. Rather both male and female students have strongly agreed to the statement. Similarly, 72% female and 80% male students have disagreed with item 3 which is a negative statement. It shows that both male and female students perceive democratic classroom a place where students can speak freely to others without any fear. The tables also show some strong consistencies in the perceptions of the students with regard to some reverse statements. For example, the level of disagreement to item 7 of the female students is highly consistent with the level of agreement of male students. The level of disagreement is that 80% of both male and female students have responded that students in a democratic classroom are not hesitant to speak on a given topic in the class. This further shows that there is a less significant difference in the perceptions of male versus female students. Similarly, for item 5 and 4 more than 80% of both male and female students have agreed that students in democratic classroom are motivated to take part in class debates and can express their views without any difficulty.

5. CONCLUSION
The purpose of this paper was to examine the effects of democratic classroom environment on communication skills of mechanical engineering students in the two selected colleges in Pakistani context. The result showed that the classroom environment had great importance in the academic life of the students. Generally, classroom is not a place where only knowledge is transmitted to the learners but it is also a place where the personality of the child is developed and habits are formed. Several studies have examined the relationship between democratic classroom environment and student academic achievements. This study particularly tested the following hypothesis to answer the question whether or not democratic classroom environment affected communication skills of students. The results showed that there was no significance difference in the perceptions of male and female students about the effect of democratic classroom in the communication skills of the students. Based on the analysis, 90% male and 92% female students showed a high level of agreements towards the contribution of democratic classroom environment in enhancing the communication skills of the students. Considering the Chi-Square test, it appears that both male and female students strongly believed that a democratic classroom environment improved communication skills of the students irrespective of the gender. The $\chi^2 = 0.157$ (df -1), which was not significant at P. <. 0.05 showed that the null hypothesis “there is no significant difference in the perceptions of male versus female students regarding the effect of democratic classroom environment upon communication skills of students” could not be rejected. In contrast, it was accepted. The observed values of both male and female students showed that they strongly favoured democratic classroom environment. Thus, it was concluded that the democratic classroom environment promotes students’ communication skills irrespective of the gender difference. Therefore, all students can have good opportunity to study and communicate their ideas across for the benefit of the college in general and the engineering department in particular.

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REFERENCES