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## ICT and Student Interaction: Experiences at the University of Eastern Africa, Baraton, Kenya

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### Abstract

The present study employed Case Study research design to establish the role of ICT on student interaction at the University of Eastern Africa Baraton, Kenya. Expert judgment established validity of research instruments. Reliability of questionnaire items was between 7.61 and 8.61 Cronbach's alfa through SPSS program. Convenient sampling determined 345 students who filled the questionnaire. T-test and ANOVA tested five null hypotheses and it was found that students regardless their categorizations agreed to have student-administration interaction and that ICT is useful for their interaction but there is a minimal ICT-based interaction between teachers and students. Female students use ICT to interact with teachers and content but male students' interaction with teachers and content is highly limited. Researchers recommend that the university should maximize availability of ICT resources in order to enhance student interaction with teachers, content, fellow students and administration. Male students need to be motivated to make use of ICT facilities for academic interactions. Further research is recommended on student interaction through other variables apart from ICT.

**Keywords:** ICT, Interaction, Baraton, Kenya, Digital Divide, Kenya.

### Introduction

Many authors have recognized interaction as an important tool for maximized learning outcomes. Gillies (2007, p. 244), for example, argues that "when children interact cooperatively

they learn to listen to what others have to say, give and receive information, discuss differing perspectives, and in so doing develop mutual understandings of the topic at hand. Obi and Kalu (2013, p. 172) advise that “teachers should bring their teaching to the level of the students’ aptitude by using familiar instructional resources ... and make classroom interactions more interesting so as to arouse the interest of the students and academic excellence.” Oluoch-Suleh (2014) maintains that teachers should give positive reinforcement to the responses given by learners and encourage student-teacher interaction.

While student interaction can be viewed at different angles, the present study investigates on Information Communication and Technology (ICT) and student interaction. As we are living in the age of science and technological innovations, ICT has occupied the mind of young people to the extent that students spend much of their time with ICT gadgets than with anything else. As indicated by (Wilen-Daugenti and McKee, 2008),

Adults ages 18–26 are typically the first to adopt new technologies. Many of these early adopters are new, or “evergreen,” students who bring these technologies onto college campuses. Because of this, students expect their schools to have the infrastructure to support the latest technologies.

La (2001, pp.43-44) argues: “as increasingly more students are using the internet as a tool for learning, skills of information gathering and evaluation have now been considered as essential skills in schools.” In response to this issue, Ngussa and Makewa (2014) suggest that this kind of situation requires higher education institutions and perhaps all other levels of education to be digitally conscious by providing ICT-based education and conducive environments that support the use of ICT in teaching and learning transaction. ICT-Based education is a system of instruction that involves combination of computers and communication technologies. As argued by Makewa et al (2014), ICT Integration is important endeavor in combating digital divide, bringing about digital opportunity and paradigm shift from teacher centered to student centered learning, whereby the teacher passes the information quicker and in a more understandable manner.

It is worth noting that advanced technologies have tremendously changed teaching and learning modalities in the 21<sup>st</sup> Century (Kauchak & Engen, 2008) and have been proved to afford critical thinking, informed decision making and problem solving skills in response to digital age challenges and experiences (Gagne et al., 2005). ICT particularly has become an essential tool in enhancing learning in the wake of contemporary technological era. Developments of ICT bring about massive changes as the world evolves into post industrial societies (Reigeluth, 2005). As a result, teachers have greater opportunities to communicate and interact with students by the use of computer and related technologies (Smaldino et al., 2008). Lai in Taylor and Hogenbirk (2001) contends that internet can be used as a tool to support constructivism approaches of learning, enabling learners to easily access essential materials in the learning process. This implies that as we live in the age of advanced technologies, ICT becomes an essential tool for educational enterprise especially in the institutions of higher learning. According to Glatthorn et al (2009), when implemented appropriately, technology can increase student interaction with a number of variables and has a relevant impact on student achievement. Particularly, significance of technology in increasing student interaction is seen in the following ways:

First, it enhances students' cooperative learning. The use of ICT in terms of wide area networked computers and printers in classrooms settings enhances and supports cooperative learning. Cennamo, Ross and Ertmer (2014, p. 113) add on the power of computer on student-student interaction. They argue that "group works provide an excellent opportunity for the more proficient students to support less proficient students in developing their technological competencies, yet take care to ensure that each student gets an equal chance to work with the technology." They also advise that when using computers to enhance student-student interaction, "it is important to establish an atmosphere where dominance with a few individuals is not tolerated.

Secondly, it increases student-teacher interaction in that new wave of technological advancement allows teachers to exchange information with students more easily. Teachers can use this information exchange opportunities to enhance interaction with the learners in such a way that teachers can receive students' assignment and return them online.

Thirdly, it enhances global interaction. Through internet technology, students develop a better understanding of other cultures and access information from all parts of the globe, thus paving ways for students to interact with a wide range of other cultures and well-rounded content.

Lastly, student-administration interaction. This is when students through the use of ICT related facilities can access important information from the university administration such as examination results, school fees transactions, academic calendars and related issues.

In summary, these ways of interaction can be placed into four types namely: Student-student interaction, student teacher interaction, student content interaction and student-administration interaction.

The fact that technology has become common in society does not necessarily mean that it is rightly applied to the actual functioning of the teaching-learning transactions (La, 2001). While there are a number of variables with which student can interact to increase learning effectiveness, this study sought to establish the role of ICT on four types of students' interaction: student –student, student-teacher, student-content and student-administration interaction.

### **Methodology of the Study**

The study used a Case Study research design whereby both descriptive and inferential statistics were employed in data analysis procedures. T-test and Analysis of Variance (ANOVA) were used to test five null hypotheses at 0.05 level of significance. The study was conducted at the University of Eastern Africa, Baraton which is a private institution of higher learning operated by the Seventh-Day Adventist Church in Kenya. The university offers multidisciplinary educational programs in various schools including School of Education, School of Business, School of Science and Technology and School of Humanities and Social Sciences from which students participated in this study.

Convenient sampling procedure was applied in data collection. A total number of 345 students participated by filling the questionnaire. The researchers distributed the questionnaires to students in their respective academic schools through research assistants.

Researchers used their expertise to look critically at the questionnaire items in relation to research questions to ensure validity of the instrument. Each subsection of questionnaire items was tested through SPSS program to ensure acceptable reliability. SPSS provided the following

results in terms of cronbach's alpha in different variables to indicate that the questionnaire instrument was reliable and authentic: Student-Teacher Interaction (7.61), Student-Student Interaction (8.07), Student-Content Interaction (8.61), Student-Administration Interaction (8.33) and Student Attitude (7.87).

## Results and Discussion

This section was guided by six research questions. Five of these questions called for hypothesis testing using the SPSS. To answer these questions, the mean scores of students' response to the questionnaire items were interpreted in four response zones: 3.50-4.00 = Strong Agreement, 2.50-3.49 = Agreement, 1.50-2.49 = Disagreement and 1.00-1.49 = Strong Disagreement.

### 1. What is the Level of Student Interaction using ICT with Teachers, Fellow Students, Content and Administration?

In order to determine the levels of student interaction with teachers, fellow students, content and administration, the researchers used descriptive statistics through SPSS to determine mean scores and ranges in each variable. According to Mugenda & Mugenda (2003), mean is the average of a set of score or measurement which is most frequently used measure of central tendency and is calculated by adding up all the scores and dividing the sum by the total number of scores. Koul (2002) regards range as the most general and simplest measure of variability. It is the difference between the most extreme scores in the distribution.

As indicated in Table 1, the range of student interaction with all the variables was 3.00. The mean score of student interaction with aforementioned variables was found to be in the following descending order:

- Student-content interaction (3.39)
- Student-administration (3.29)
- Student-Student (2.88)
- Student Teacher (2.48)

Student-content, student-administration and student-student interaction fell within the "Agreement Zone" which implies that students agreed that they use ICT to interact with content, administration and fellow students. However, student-teacher interaction fell within the "Disagreement Zone" (1.50-2.49) meaning that students disagreed that they use ICT to interact with teachers. This implies that there is minimal ICT-based interaction between teachers and students regarding academic matters.

### 2. Is there significant difference in the attitudes of students, categorized according to gender and program of study, toward ICT?

This research question called for testing of the following null hypothesis using T-test and Analysis of Variance (ANOVA):

*There is no significant difference in the attitudes of students, categorized according to gender and program of study, toward ICT.*

As observed in Table 2, female students had a higher mean score in their attitude toward usefulness of ICT in student interaction (3.31) as compared to their male counterparts (3.28).



Table 3, however, indicates a Sig. of .633 which is greater than the critical value (.005) implying that the difference of female and male students' mean scores appear by chance. Both mean score fall within the group of 2.50-3.49 which denotes "Agreement." This implies that both female and male students agreed that ICT is important in enhancing student interaction. It is therefore inferred that there is no significant difference in the attitude of students, categorized according to gender, on the place of ICT in student interaction.

Table 4 gives mean scores of students categorized according to school, students in the School of Education having the highest mean score of 3.41 followed by School of Science (3.31), School of Business (3.23), School of Humanity and Social Sciences (3.23) and Pre-University Students (3.21). All groups' mean scores, however, fell within the range of 2.50-3.49 which denotes "Agreement Zone". This means that students regardless their categorization according to schools agreed that ICT is useful for student interaction. Table 5, however, indicates a Sig. of 0.40 which is lesser than the critical value suggesting possible significant difference among students categorized according to school. Test for homogeneity in Table 6, however gives the Sig. of .095 which is greater than critical value meaning that the difference among students categorized according to schools happens by chance and therefore is not significant. We therefore infer that there is no significant difference in the attitude of students, categorized according to school, on the place of ICT in student interaction.

### **3. Is there significant difference in the level of student-teacher interaction in terms of Students' Gender and Program of Study?**

This research question called for testing of the following null hypothesis using T-test and Analysis of Variance (ANOVA):

*There is no significant difference in the level of student-teacher interaction by Students categorized according to Gender and Program of Study.*

According to results in Table 7, female students had a higher mean score (2.57) of student-teacher interaction than male students (2.40). The mean score of female students fell within 2.50-3.49 which denotes "Agreement Zone" while that of male students fell within 1.50-2.49 which is in the "Disagreement Zone."

Further, Levene's Test for Equality of Variances in Table 8 indicates a Sig. of .43 which is greater than critical value, and therefore suggests homogeneity, leading us to use Equal variances not assumed Sig. of .007 which is lesser than the critical value and therefore suggesting a significant difference in student-teacher interaction by students categorized according to gender. This leads us to reject the null hypothesis and therefore, infer that there a significant difference in student-teacher interaction by students categorized according to gender. Therefore, while female students use ICT to interact with teachers regarding academic issues, male students do not.

Table 9 indicates mean score of student- teacher interaction by students categorized according to schools, students in School of Education having the highest mean score (3.41) followed by School of Science (3.31), School of Business (3.24), Humanity and Social Sciences (3.23) and finally Pre-University Students (3.21). The mean score of students in all schools, however, is within the range of 2.51-3.49 which is "Agreement Zone." This implies that students in all schools agreed to

have student-teacher interaction using ICT. Analysis of Variance in Table 10 indicates a Sig. of .40 which is greater than the critical value suggesting no significant difference. Therefore, we infer that there is no significant difference in student-teacher interaction by students categorized according to schools.

#### **4. Is there significant difference in the level of student-Student interaction in terms of Gender and Program of Study?**

This research question called for testing of the following null hypothesis using T-test and Analysis of Variance (ANOVA):

*There is no significant difference in the level of student-Student interaction in terms of students' Gender and Program of Study.*

In response to this question, Table 11 indicates the mean score of 2.89 for female students and 2.87 for male students. Further, Levene's Test for Equality of Variances in Table 12 indicates a Sig. of .52 which is greater than critical value, and therefore suggests homogeneity, leading us to use equal variances not assumed Sig. of .80 which is greater than the critical value and therefore suggesting no significant difference in student-student interaction by students categorized according to gender.

Table 13 indicates that students in the School of Business have the highest mean score (3.01) of student-student interaction using ICT, followed by students in the School of Science and School of Education (2.94), Pre-University Students (2.75) and lastly students in the School of Humanities and Social Sciences (2.67). The ANOVA Sig. of .006 in Table 14 is lesser than the critical value suggesting significant difference in student-student interaction by school. Multi-comparison of student-student interaction in Table 15 indicates significant difference between Science and Humanities (.27), Business and Humanities and Social Sciences (.34), and Humanities and Social Science and Education (-.27).

#### **5. Is there significant difference in the level of student-content interaction in terms of Students' Gender and Program of Study?**

This research question called for testing of the following null hypothesis using T-test and Analysis of Variance (ANOVA):

*There is no significant difference in the level of student-content interaction by students categorized according to Gender and Program of Study.*

Table 16 indicates that female students have higher student-content interaction mean score (3.40) than male students (3.38). Levene's Test for Equality of Variances in Table 17, however, with the Sig. of 0.92, which is greater than the critical value leading us to employ Equal variances assumed mean of .688 which is greater than the critical value suggesting that the difference happens by chance. And therefore, we infer that there is no significant difference in student-content interaction by students categorized according to gender.

As far as student-content interaction by schools is concerned, as indicated in Table 18, students in the Pre-University Program, School of Science and School of Business have the highest mean score of (3.41), followed by School of Education (3.37) and lastly comes the School of Humanities and Social Sciences (3.36). Mean scores in all groups fell within the zone of "Agreement" (2.50-3.49). The ANOVA Sig. of .97 which is greater than critical value, leading us to infer that there is no significant difference in student-content interaction by students categorized according to school.

#### **6. Is there significant difference in the level of student-administration interaction in terms of Students' Gender and Program of Study?**

This research question called for testing of the following null hypothesis using T-test and Analysis of Variance (ANOVA):

*There is no significant difference in the level of student-administration interaction by students categorized according to Gender and Program of Study.*

As seen in Table 20, female students had higher mean score (3.31) of student-administration interaction than male students (3.28). Both groups' mean scores, however, fell within the "Agreement Zone" (2.50-3.49). The Sig. of .381 in Table 21 Levene's Test for Equality of Variances in Table 21, however, with the Sig. of .381 which is greater than the critical value leading us to employ Equal variances assumed mean of .723 which is greater than the critical value suggesting that the difference happens by chance. And therefore, we infer that there is no significant difference in student-administration interaction by students categorized according to gender.

As far as student-administration by students categorized according to school is concerned, Pre-University students in Table 22 have the highest mean score of 3.46 followed by School of Education (3.43), School of Business (3.31), School of Humanities and Social Sciences (3.26) and finally School of Science (3.25). Groups' mean scores have slight variation but fall within the "Agreement Zone" (2.50-3.49) meaning that students in all groups agreed to have student-administration interaction by the use of ICT. Further, the ANOVA Sig. of .272 in Table 23 is greater than the critical value and therefore indicates that the difference happens by chance and therefore we accept the null hypothesis that there is no significant difference in the level of student-administration interaction by students categorized according to Program of Study.

#### **Summary, Conclusions and Recommendations**

This study concludes that interaction is important tool for maximized learning outcomes. While student interaction can be viewed at different angles, the present study investigated on Information Communication and Technology (ICT) and students' interaction with four variables namely teachers, content, fellow students and administration.

The study concludes that students use ICT to interact with content, administration and fellow students but there is minimal ICT-based interaction between teachers and students regarding academic matters although both female and male students agreed that ICT is important in enhancing student interaction with aforementioned variables. It is also worth noting that students regardless their school categorizations agreed that ICT is useful for student interaction. While female students use ICT to interact with teachers, male student interaction with teachers



was highly limited. Although there is no significant difference in student-content interaction by students categorized according to gender, female student-content interaction was found higher than that of male student. Finally, students in all categorizations agreed to have student-administration interaction by the use of ICT.

With these results, researchers recommend that the university administration should maximize availability of ICT resources within the university in order to enhance student interaction with teachers, content, fellow students and administration. Secondly, male students need to be motivated to make use of ICT facilities for interaction with teachers for academic issues. Lastly, further research can be done to investigate student interaction through other variables apart from ICT.

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# TABLES

|                        | N   | Range | Minimum | Maximum | Mean   | Std. Deviation |
|------------------------|-----|-------|---------|---------|--------|----------------|
| Student-Teacher        | 345 | 3.00  | 1.00    | 4.00    | 2.4804 | .57907         |
| Student-Student        | 345 | 3.00  | 1.00    | 4.00    | 2.8823 | .58846         |
| Student-Content        | 345 | 3.00  | 1.00    | 4.00    | 3.3909 | .57831         |
| Student-Administration | 345 | 3.00  | 1.00    | 4.00    | 3.2965 | .62150         |
| Valid N (listwise)     | 345 |       |         |         |        |                |

**Table 1: Descriptive Statistics for students' interaction with different variables**

|          | What is your gender? | N   | Mean   | Std. Deviation | Std. Error Mean |
|----------|----------------------|-----|--------|----------------|-----------------|
| ATTITUDE | Male                 | 176 | 3.2832 | .60149         | .04534          |
|          | Female               | 168 | 3.3143 | .60152         | .04641          |

**Table 2: Group Statistics Student Attitudes by Gender toward ICT**

|          | Levene's Test for Equality of Variances | t-test for Equality of Means |      |       |         |                 |                 |                       |   |        |
|----------|---|------------------------------|------|-------|---------|-----------------|-----------------|-----------------------|---|--------|
|          |   | F                            | Sig. | T     | df      | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |        |
|          |   |                              |      |       |         |                 |                 |                       | Lower                                     | Upper  |
| ATTITUDE | Equal variances assumed                 | .056                         | .812 | -.479 | 342     | .633            | -.03105         | .06488                | -.15866                                   | .09657 |
|          | Equal variances not assumed             |                              |      | -.479 | 341.255 | .633            | -.03105         | .06488                | -.15866                                   | .09657 |

**Table 3: Independent Samples Test for Student by School Attitudes toward ICT**

| ATTITUDE           |     |        |                   |               |                                     |                |             |             |
|--------------------|-----|--------|-------------------|---------------|-------------------------------------|----------------|-------------|-------------|
|                    |     |        |                   |               | 95% Confidence Interval<br>for Mean |                |             |             |
|                    | N   | Mean   | Std.<br>Deviation | Std.<br>Error | Lower<br>Bound                      | Upper<br>Bound | Minimu<br>m | Maximu<br>m |
| Science            | 154 | 3.3123 | .65413            | .05271        | 3.2082                              | 3.4165         | 1.00        | 4.00        |
| Business           | 39  | 3.2372 | .71669            | .11476        | 3.0049                              | 3.4695         | 1.00        | 4.00        |
| Humanity           | 76  | 3.2263 | .51778            | .05939        | 3.1080                              | 3.3446         | 2.00        | 4.00        |
| Education          | 62  | 3.4097 | .50755            | .06446        | 3.2808                              | 3.5386         | 2.00        | 4.00        |
| Pre-<br>university | 13  | 3.2077 | .36162            | .10030        | 2.9892                              | 3.4262         | 2.80        | 4.00        |
| Total              | 344 | 3.2984 | .60083            | .03239        | 3.2347                              | 3.3621         | 1.00        | 4.00        |

**Table 4: Description for Mean Score of Student Attitude toward ICT by School**

| ATTITUDE          |                   |     |             |       |      |
|-------------------|-------------------|-----|-------------|-------|------|
|                   | Sum of<br>Squares | Df  | Mean Square | F     | Sig. |
| Between<br>Groups | 1.446             | 4   | .361        | 1.001 | .407 |
| Within Groups     | 122.376           | 339 | .361        |       |      |
| Total             | 123.822           | 343 |             |       |      |

**Table 5: ANOVA for Students Attitudes by School**

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 1.997            | 4   | 339 | .095 |

**Table 6: Homogeneity of Variances, Students Categorized by Schools**

| What is<br>your<br>gender? | N   | Mean   | Std.<br>Deviation | Std. Error<br>Mean |
|----------------------------|-----|--------|-------------------|--------------------|
| STUDENTTEACHER Male        | 177 | 2.3985 | .57918            | .04353             |
| Female                     | 168 | 2.5666 | .56799            | .04382             |

**Table 7: Group Statistics Student-Teacher Interaction by Gender**

|                |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |         |                 |                 |                       |   |         |
|----------------|-----------------------------|---|------|------------------------------|---------|-----------------|-----------------|-----------------------|---|---------|
|                |                             | F                                       | Sig. | T                            | Df      | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |         |
|                |                             |   |      |                              |         |                 |                 |                       | Lower                                     | Upper   |
| STUDENTTEACHER | Equal variances assumed     | .612                                    | .434 | 2.719                        | 343     | .007            | -.16806         | .06180                | -.28962                                   | -.04651 |
|                | Equal variances not assumed |   |      | 2.721                        | 342.630 | .007            | -.16806         | .06177                | -.28956                                   | -.04657 |

**Table 8: Independent Samples Test Student-Teacher Interaction by Gender**

| ATTITUDE       |     |        |                |            |                                  |             |         |         |
|----------------|-----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|                |     |        |                |            | 95% Confidence Interval for Mean |             |         |         |
|                | N   | Mean   | Std. Deviation | Std. Error | Lower Bound                      | Upper Bound | Minimum | Maximum |
| Science        | 154 | 3.3123 | .65413         | .05271     | 3.2082                           | 3.4165      | 1.00    | 4.00    |
| Business       | 39  | 3.2372 | .71669         | .11476     | 3.0049                           | 3.4695      | 1.00    | 4.00    |
| Humanity       | 76  | 3.2263 | .51778         | .05939     | 3.1080                           | 3.3446      | 2.00    | 4.00    |
| Education      | 62  | 3.4097 | .50755         | .06446     | 3.2808                           | 3.5386      | 2.00    | 4.00    |
| Pre-university | 13  | 3.2077 | .36162         | .10030     | 2.9892                           | 3.4262      | 2.80    | 4.00    |
| Total          | 344 | 3.2984 | .60083         | .03239     | 3.2347                           | 3.3621      | 1.00    | 4.00    |

**Table 9: Descriptive of Student-Teacher Interaction by School**

| ATTITUDE       |                |     |             |       |      |
|----------------|----------------|-----|-------------|-------|------|
|                | Sum of Squares | Df  | Mean Square | F     | Sig. |
| Between Groups | 1.446          | 4   | .361        | 1.001 | .407 |
| Within Groups  | 122.376        | 339 | .361        |       |      |
| Total          | 123.822        | 343 |             |       |      |

**Table 10: ANOVA Student-Teacher Interaction by School**

|                | What is your gender? | N   | Mean   | Std. Deviation | Std. Error Mean |
|----------------|----------------------|-----|--------|----------------|-----------------|
| STUDENTSTUDENT | Male                 | 177 | 2.8747 | .60551         | .04551          |
|                | Female               | 168 | 2.8903 | .57165         | .04410          |

**Table 11: Group Statistics Student-Student Interaction by Gender**

|   | Levene's Test<br>for Equality of<br>Variances | t-test for Equality of Means |       |         |      |                     |                        |                                 |  |       |
|---|---|------------------------------|-------|---------|------|---------------------|------------------------|---------------------------------|--|-------|
|   |   | F                            | Sig.  | t       | Df   | Sig. (2-<br>tailed) | Mean<br>Differe<br>nce | Std.<br>Error<br>Differe<br>nce | 95%<br>Confidence<br>Interval of the<br>Difference |       |
|   |   |                              |       |         |      |                     |                        |                                 | Lower  | Upper |
| STUDENTS Equal<br>TUDENT variances<br>assumed | .414  | .521                         | -.246 | 343     | .805 | -.01564             | .06347                 | -.14049                         | .10920   |       |
|   |   |                              | -.247 | 342.991 | .805 | -.01564             | .06338                 | -.14030                         | .10901   |       |

**Table 12: Independent Samples Test Student-Student Interaction by Gender**

STUDENTSTUDENT

|                | N   | Mean   | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|----------------|-----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|                |     |        |                |            | Lower Bound                      | Upper Bound |         |         |
| Science        | 154 | 2.9419 | .58323         | .04700     | 2.8491                           | 3.0348      | 1.00    | 4.00    |
| Business       | 39  | 3.0127 | .52940         | .08477     | 2.8411                           | 3.1843      | 1.75    | 4.00    |
| Humanity       | 77  | 2.6737 | .64000         | .07294     | 2.5284                           | 2.8190      | 1.12    | 4.00    |
| Education      | 62  | 2.9396 | .50923         | .06467     | 2.8103                           | 3.0689      | 1.50    | 4.00    |
| Pre-university | 13  | 2.7473 | .61093         | .16944     | 2.3781                           | 3.1164      | 1.71    | 3.38    |
| Total          | 345 | 2.8823 | .58846         | .03168     | 2.8200                           | 2.9446      | 1.00    | 4.00    |

**Table 13: Descriptive of Student-Student Interaction by School**

STUDENTSTUDENT

|                | Sum of Squares | Df  | Mean Square | F     | Sig. |
|----------------|----------------|-----|-------------|-------|------|
| Between Groups | 5.002          | 4   | 1.250       | 3.726 | .006 |
| Within Groups  | 114.121        | 340 | .336        |       |      |
| Total          | 119.123        | 344 |             |       |      |

Table 14: ANOVA Student-Student Interaction by School

| (I) What is your school? | (J) What is your school? | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|--------------------------|--------------------------|-----------------------|------------|------|-------------------------|-------------|
|                          |                          |                       |            |      | Lower Bound             | Upper Bound |
| Science                  | Business                 | -.07072               | .10386     | .496 | -.2750                  | .1336       |
|                          | Humanity                 | .26824*               | .08086     | .001 | .1092                   | .4273       |
|                          | Education                | .00233                | .08714     | .979 | -.1691                  | .1737       |
|                          | Pre-university           | .19469                | .16733     | .245 | -.1344                  | .5238       |
| Business                 | Science                  | .07072                | .10386     | .496 | -.1336                  | .2750       |
|                          | Humanity                 | .33897*               | .11387     | .003 | .1150                   | .5629       |
|                          | Education                | .07306                | .11841     | .538 | -.1598                  | .3060       |
|                          | Pre-university           | .26542                | .18554     | .153 | -.0995                  | .6304       |
| Humanity                 | Science                  | -.26824*              | .08086     | .001 | -.4273                  | -.1092      |
|                          | Business                 | -.33897*              | .11387     | .003 | -.5629                  | -.1150      |
|                          | Education                | -.26591*              | .09886     | .008 | -.4604                  | -.0715      |
|                          | Pre-university           | -.07355               | .17372     | .672 | -.4153                  | .2681       |
| Education                | Science                  | -.00233               | .08714     | .979 | -.1737                  | .1691       |
|                          | Business                 | -.07306               | .11841     | .538 | -.3060                  | .1598       |
|                          | Humanity                 | .26591*               | .09886     | .008 | .0715                   | .4604       |
|                          | Pre-university           | .19236                | .17673     | .277 | -.1553                  | .5400       |
| Pre-university           | Science                  | -.19469               | .16733     | .245 | -.5238                  | .1344       |
|                          | Business                 | -.26542               | .18554     | .153 | -.6304                  | .0995       |
|                          | Humanity                 | .07355                | .17372     | .672 | -.2681                  | .4153       |



STUDENTSTUDENT

|                | Sum of Squares | Df      | Mean Square | F     | Sig.   |       |
|----------------|----------------|---------|-------------|-------|--------|-------|
| Between Groups | 5.002          | 4       | 1.250       | 3.726 | .006   |       |
| Within Groups  | 114.121        | 340     | .336        |       |        |       |
| Education      |                | -.19236 | .17673      | .277  | -.5400 | .1553 |

\*. The mean difference is significant at the 0.05 level.

**Table 15: Multiple Comparison Student-Student Interaction**

|                | What is your gender? | N   | Mean   | Std. Deviation | Std. Error Mean |
|----------------|----------------------|-----|--------|----------------|-----------------|
| STUDENTCONTENT | Male                 | 177 | 3.3787 | .55567         | .04177          |
|                | Female               | 168 | 3.4038 | .60265         | .04650          |

**Table 16: Group Statistics Student-Content Interaction by Gende**

|                | Levene's Test for Equality of Variances |      | t-test for Equality of Means |       |                 |                 |                       |   |         |        |
|----------------|---|------|------------------------------|-------|-----------------|-----------------|-----------------------|---|---------|--------|
|                | F                                       | Sig. | T                            | df    | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |         |        |
|                |   |      |                              |       |                 |                 |                       | Lower                                     | Upper   |        |
| STUDENTCONTENT | Equal variances assumed                 | .011 | .915                         | -.402 | 343             | .688            | -.02505               | .06237                                    | -.14772 | .09762 |
|                | Equal variances not assumed             |      |                              | -.401 | 337.027         | .689            | -.02505               | .06250                                    | -.14799 | .09789 |

**Table 17: Independent Samples Test for Student-Content Interaction**

STUDENTCONTENT

|                | N   | Mean   | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|----------------|-----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|                |     |        |                |            | Lower Bound                      | Upper Bound |         |         |
| Science        | 154 | 3.4088 | .62755         | .05057     | 3.3089                           | 3.5087      | 1.00    | 4.00    |
| Business       | 39  | 3.4060 | .57836         | .09261     | 3.2185                           | 3.5935      | 1.67    | 4.00    |
| Humanity       | 77  | 3.3604 | .56429         | .06431     | 3.2323                           | 3.4885      | 1.83    | 4.00    |
| Education      | 62  | 3.3710 | .49627         | .06303     | 3.2449                           | 3.4970      | 2.33    | 4.00    |
| Pre-university | 13  | 3.4103 | .47442         | .13158     | 3.1236                           | 3.6969      | 2.50    | 4.00    |
| Total          | 345 | 3.3909 | .57831         | .03114     | 3.3297                           | 3.4522      | 1.00    | 4.00    |

Table 18: Descriptive of Student-Content Interaction by School

|                | Sum of Squares | Df  | Mean Square | F    | Sig. |
|----------------|----------------|-----|-------------|------|------|
| Between Groups | .159           | 4   | .040        | .118 | .976 |
| Within Groups  | 114.891        | 340 | .338        |      |      |
| Total          | 115.050        | 344 |             |      |      |

Table 19: ANOVA Student-Content Interaction by School

| What is your gender?    | N   | Mean   | Std. Deviation | Std. Error Mean |
|-------------------------|-----|--------|----------------|-----------------|
| STUDENTADMINISTRAT Male | 177 | 3.2849 | .62304         | .04683          |
| ION Female              | 168 | 3.3087 | .62150         | .04795          |

**Table 20: Group Statistics Student-Administration Interaction by Gender**

|                       |                             | Levene's Test for Equality of Variances |      | t-test for Equality of Means |         |                 |                 |                       |   |        |
|-----------------------|-----------------------------|---|------|------------------------------|---------|-----------------|-----------------|-----------------------|---|--------|
|                       |                             | F                                       | Sig. | t                            | Df      | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |        |
|                       |                             |   |      |                              |         |                 |                 |                       | Lower                                     | Upper  |
| STUDENTADMINISTRATION | Equal variances assumed     | .771                                    | .381 | -.355                        | 343     | .723            | -.02380         | .06703                | -.15564                                   | .10804 |
|                       | Equal variances not assumed |   |      | -.355                        | 342.149 | .723            | -.02380         | .06702                | -.15563                                   | .10804 |

**Table 21: Independent Samples Test Student-Administration Interaction**

STUDENTADMINISTRATION

|                | N   | Mean   | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|----------------|-----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|                |     |        |                |            | Lower Bound                      | Upper Bound |         |         |
| Science        | 154 | 3.2452 | .67955         | .05476     | 3.1371                           | 3.3534      | 1.00    | 4.00    |
| Business       | 39  | 3.3120 | .62213         | .09962     | 3.1103                           | 3.5136      | 1.40    | 4.00    |
| Humanity       | 77  | 3.2563 | .61704         | .07032     | 3.1162                           | 3.3963      | 1.33    | 4.00    |
| Education      | 62  | 3.4290 | .48570         | .06168     | 3.3057                           | 3.5524      | 2.00    | 4.00    |
| Pre-university | 13  | 3.4641 | .42763         | .11860     | 3.2057                           | 3.7225      | 2.50    | 4.00    |
| Total          | 345 | 3.2965 | .62150         | .03346     | 3.2307                           | 3.3623      | 1.00    | 4.00    |

**Table 22: Descriptive of Student-Administration Interaction by School**

STUDENTADMINISTRATION

|                   | Sum of<br>Squares | Df  | Mean Square | F     | Sig. |
|-------------------|-------------------|-----|-------------|-------|------|
| Between<br>Groups | 1.993             | 4   | .498        | 1.294 | .272 |
| Within Groups     | 130.881           | 340 | .385        |       |      |
| Total             | 132.874           | 344 |             |       |      |

**Table 23: ANOVA Student-Administration Interaction by School**