# ANALYZING GENDER AND DEPARTMENTAL INFLUENCE ON CLASSROOM TECHNOLOGY USAGE: A MULTIVARIATE APPROACH

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***ABSTRACT:*** *The usage of ICT in the classroom and how much of an influence students' perceptions have on their learning are key elements in determining how ICT will affect students in the future. This study examines if there are differences between gender and department in how students perceive the use of technology in the classroom and the degree of their influence. In this survey, 266 Siquijor State College students took part, representing a variety of colleges/departments. The study analyzed the relationship between department, gender, and student perception using a two-way factorial MANOVA. The questionnaire on Learners' Use of Technology from Prof. Anup Kumar Das and Sanjaya Mishra contains several statements that assess the perception of technology use and the amount to which learners' perceptions of technology have an influence. Results indicate that female students and students from the College of Arts and Sciences have greater perceptions of how technology is used in academics. However, when it comes to the degree to which students perceive the use of technology in the classroom, male respondents and students from the College of Criminal Justice Education have the highest mean.*

**Keywords:** MANOVA, TECHNOLOGY, PERCEPTION, EXTENT OF IMPACT, ICT

## I. INTRODUCTION

ICT is an essential tool in the digital age because it offers rapid and effective ways to access, connect to, and learn from dynamic data, which improves students' problem-solving skills. Students' learning experiences are improved when technology is used in the classroom because it strengthens the bonds between teachers and students and enhances teaching strategies [1]. There was an apparent difference in the perceptions of students from all departments and genders about technology usage in their studies and classes at Siquijor State College. While some departments completely embrace technology, others rely on conventional methods, which raises issues about its overall impact on learning, according to observations made in classrooms and through personal encounters with students.

This study examines the differences in perceptions of technology usage in the classroom and how it affects students' learning by department and gender. To better understand how students use technology, studies must consider these interrelated elements, as human behavior is multidimensional. In doing so, this study offers a framework for evaluating how students study technology and how common it is in classrooms.

## 2. METHODOLOGY

The goal of this study is to ascertain whether there is a connection between gender and department characteristics, students' perception of technology, and the extent of the impact of learners' perception of technology used in the classroom. A two–way factorial MANOVA (Multivariate analysis of variance) will give the investigation's phenomena a rich context for exploration. Utilizing a multivariate method will enable the assessment of the relationship between age and department. ANOVA will also be used to assess the strength of a link between two variables.

*Context and Sample*

The survey was conducted at Siquijor State College during the second semester. The information required is answered through the research questions present in the survey data. Both an online and a paper survey were used to administer the survey. The researchers used a standardized research questionnaire for data collection- the questionnaire on Learners' Use of Technology. The researchers asked permission from the authors, namely Anup Kumar Das and Sanjaya Mishra [2], to utilize the questionnaire for the said research.

Two hundred sixty – six (266) students from various sections of Siquijor State College took part in the study. While protecting participant identity and information confidentiality, the researchers presented an overview of the goals and issues of the research. Individuals completed a consent form before starting the survey, expressing their participation with informed consent. Table 1 displays the sample of the respondents, which was spread out according to their age and department of responders.

**Table 1. Frequencies and Percentages According to the Variables of the Study**

| | Categories | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 131 | 49.25 |
| | Female | 135 | 50.75 |
| **Total** | | 266 | 100 |
| **Department** | COT | 34 | 12.78 |
| | CBM | 86 | 32.33 |
| | CAS | 25 | 9.4 |
| | CCJE | 40 | 15.04 |
| | COE | 32 | 12.03 |
| | MEP | 49 | 18.42 |
| **Total** | | 266 | 100 |

*Measures*

This study concentrated on four variables: gender, department, perception of the use of technology in studies, and the extent of the impact of learners' perception of technology used in the classroom. The first variable, gender was measured by the participant's gender (1= Male, 2= Female).

The respondents' college or department was the second variable the poll assessed. Six colleges were represented by the choices (1= CAS, 2 = CBM, 3 = CCJE, 4 = COE, 5 = COT, 6 = MEP).

The third variable measured by the survey reflected six (6) statements within the instrument used on how the respondents perceived the use of technology in their studies. As a result, a 0.98 internal consistency alpha coefficient was obtained for it.

The survey's last variable focused on how many of the learners' perceptions of how technology is used to enhance learning in the classroom had an influence. Participants will respond to fifteen (15) statements that have been given. The total influence of perception on students' use of technology in the classroom was calculated to have an internal consistency alpha coefficient of 0.91.

*Analytic Approach*

The two-way factorial MANOVA was used to examine the data in this study. The unique and combined effects of the two independent variables of department and gender, on the two independent variables of perception of technology used in studies, and the degree of influence of perception of technology usage in the classroom were examined by this multivariate factorial design.

On both a multivariate and single variable level, the statistical process was utilized to ascertain correlations between the variables. A Wilk Lambda value indicated the independent factors' statistically significant impacts on the dependent variables, and a one-way analysis of variance (ANOVA) identified the locations of each dependent variable's statistically significant main effects separately. To assess statistical significance, a 0.95 confidence level was utilized.

## 3. RESULTS AND DISCUSSIONS

According to Table 2, women were more favorably seen in perceptions 1, 2, 5, and 6 on the use of technology in their studies. It was discovered that technology aids in deep topic comprehension makes work easier, enhances information management abilities generally, and enhances long–term career chances. However, men are more likely to say that technology inspires them to investigate a wide range of previously unexplored issues and makes it simple for them to interact with others both inside and outside of the college.

This finding is in line with the finding of research by Shuell, Thomas and Farber, Stacey [3], which found that women evaluated the use of technology for learning and classroom teaching somewhat lower than their male colleagues.

Table 3 demonstrates that, in terms of students' perceptions of technology in their studies, the College of Arts and Sciences department, which had the fewest responses overall, had the highest mean among the other departments. It demonstrated that when it came to perceptions 1, 2, 4, and 5, the CAS department had the greatest mean. The highest mean in terms of perceptions 3 and 4 belonged to a total of 40 respondents from the College of Criminal Justice and Education (CCJE). Briz-Ponce, Pereira, Carvalho, Juanes-Méndez & García-Peñalvo [4] found a strong attitude of university students toward the use and recommendation of mobile technology.

Timothy Teo and Mingming Zhou's [5] study "The Influence of Teachers' Conceptions of Teaching and Learning on Their Technology Acceptance" discovered that teachers' views on teaching, whether constructivist or conventional, had a big impact on how they accept technology.

**Table 2: Multivariate Analysis of Gender and Student's Perception of Technology**

| Perception | Gender | Mean | Std. Deviation | N |
|---|---|---|---|---|
| Perception1: Technology helps understand the subject deeply | Male | 2.64 | 1.885 | 131 |
| | Female | 2.93 | 1.987 | 135 |
| | Total | 2.79 | 1.939 | 266 |
| Perception2: Completing work more convenient | Male | 2.62 | 1.895 | 131 |
| | Female | 2.7 | 1.955 | 135 |
| | Total | 2.66 | 1.923 | 266 |
| Perception3: Motivates to explore more topics | Male | 1.82 | 0.846 | 131 |
| | Female | 1.59 | 0.786 | 135 |
| | Total | 1.7 | 0.823 | 266 |
| Perception4: Collaborate with others more easily | Male | 1.86 | 0.926 | 131 |
| | Female | 1.6 | 0.613 | 135 |
| | Total | 1.73 | 0.793 | 266 |
| Perception5: Improve IT/Information management skills in general | Male | 2.57 | 1.902 | 131 |
| | Female | 2.76 | 1.972 | 135 |
| | Total | 2.67 | 1.936 | 266 |
| Perception6: Improve career/employment prospects in the long term | Male | 2.62 | 1.891 | 131 |
| | Female | 2.82 | 1.988 | 135 |
| | Total | 2.72 | 1.94 | 266 |

The study demonstrated that incorporating these ideas into technology acceptance models (TAM) led to a more sophisticated comprehension. However, no moderating effects were detected from demographic characteristics including age, gender, or teaching experience. The study emphasized how crucial it is to match instructional philosophies with technology use to successfully integrate it into the classroom.

**Table 3: Multivariate analysis of Department and Student's Perception of Technology**

| Perception | Department | Mean | Std. Deviation | N |
|---|---|---|---|---|
| Perception1: Technology helps understand the subject deeply | CAS | 3.24 | 2.026 | 25 |
| | CBM | 2.98 | 2 | 86 |
| | CCJE | 2.63 | 1.821 | 40 |
| | COE | 3 | 2.032 | 32 |
| | COT | 2.38 | 1.875 | 34 |
| | MEP | 2.49 | 1.85 | 49 |
| | **Total** | 2.79 | 1.939 | 266 |
| Perception2: Completing work more convenient | CAS | 3.08 | 2.04 | 25 |
| | CBM | 2.7 | 1.977 | 86 |
| | CCJE | 2.58 | 1.767 | 40 |
| | COE | 2.75 | 2.016 | 32 |
| | COT | 2.24 | 1.843 | 34 |
| | MEP | 2.69 | 1.917 | 49 |
| | **Total** | 2.66 | 1.923 | 266 |
| Perception3: Motivates to explore more topics | CAS | 1.48 | 0.51 | 25 |
| | CBM | 1.48 | 0.589 | 86 |
| | CCJE | 2.3 | 1.265 | 40 |
| | COE | 1.44 | 0.504 | 32 |
| | COT | 1.76 | 0.496 | 34 |
| | MEP | 1.86 | 0.935 | 49 |
| | **Total** | 1.7 | 0.823 | 266 |
| Perception4: Collaborate with others more easily | CAS | 1.56 | 0.507 | 25 |
| | CBM | 1.57 | 0.66 | 86 |

| | | | | |
|---|---|---|---|---|
| | CCJE | 2.05 | 1.037 | 40 |
| | COE | 1.5 | 0.508 | 32 |
| | COT | 1.82 | 0.716 | 34 |
| | MEP | 1.92 | 0.975 | 49 |
| | **Total** | 1.73 | 0.793 | 266 |
| Perception5: Improve IT/Information management skills in general | CAS | 2.96 | 2.01 | 25 |
| | CBM | 2.86 | 1.989 | 86 |
| | CCJE | 2.15 | 1.657 | 40 |
| | COE | 2.91 | 2.006 | 32 |
| | COT | 2.35 | 1.937 | 34 |
| | MEP | 2.65 | 1.953 | 49 |
| | **Total** | 2.67 | 1.936 | 266 |
| Perception6: Improve career/employment prospects in the long term | CAS | 3.32 | 1.973 | 25 |
| | CBM | 2.87 | 1.981 | 86 |
| | CCJE | 2.83 | 1.933 | 40 |
| | COE | 1.91 | 1.673 | 32 |
| | COT | 2.24 | 1.843 | 34 |
| | MEP | 2.94 | 1.952 | 49 |
| | **Total** | 2.72 | 1.94 | 266 |

The extent to which learners' perception of the usage of technology in the classroom is impacted by male respondents in Table 4. As a result, it has the greatest mean in terms of how much assertions 1, 3, 5, 6, 7, 8, 9, 12, 13 and 14 were impacted by perceptions. On the other hand, there were only three extent of perceptions statements --- statements 2, 10, and 11 where female respondents had the highest mean.

UNESCO [6], a branch of the United Nations Educational, Scientific and Cultural Organization, demonstrates how technology may significantly improve learning results for students. Thus, Jeng, Wu, Huang, Tan & Yang [7] added that Mobile devices and educational applications should not complicate the learning process, but rather facilitate student learning. Furthermore, Sezer [8] also revealed that gender factors and academic success significantly affect student attitudes toward learning and technology.

**Table 4: Multivariate analysis of Gender and the extent of the impact of learners' perception of technology used in the classroom**

| Gender | | Mean | Std. Deviation | N |
|---|---|---|---|---|
| Extent1: More actively involved in courses that use technology | Male | 3.11 | 1.345 | 131 |
| | Female | 2.87 | 1.254 | 135 |
| | **Total** | 2.99 | 1.303 | 266 |
| Extent2: Likely to skip classes when materials from course are available online | Male | 2.97 | 1.353 | 131 |
| | Female | 3.1 | 1.281 | 135 |
| | **Total** | 3.03 | 1.316 | 266 |
| Extent3: Adequately prepared to use the technology needed in the course | Male | 3.15 | 1.515 | 131 |
| | Female | 2.94 | 1.439 | 135 |
| | **Total** | 3.04 | 1.478 | 266 |
| Extent4: Technology helps feel connected to what's going on at the college | Male | 2.54 | 1.546 | 131 |
| | Female | 2.03 | 1.126 | 135 |
| | **Total** | 2.28 | 1.371 | 266 |
| Extent5: Technology makes feel connected to other students | Male | 2.36 | 1.425 | 131 |
| | Female | 2.03 | 1.146 | 135 |
| | **Total** | 2.19 | 1.299 | 266 |
| Extent6: Technology makes feel connected to teachers | Male | 2.55 | 1.49 | 131 |
| | Female | 2.24 | 1.237 | 135 |
| | **Total** | 2.39 | 1.373 | 266 |
| Extent7: Technology interferes with the ability to concentrate and think deeply | Male | 3.18 | 1.552 | 131 |
| | Female | 2.98 | 1.489 | 135 |
| | **Total** | 3.08 | 1.52 | 266 |
| Extent8: Advances may increasingly invade privacy | Male | 2.53 | 1.526 | 131 |
| | Female | 2.52 | 1.434 | 135 |
| | **Total** | 2.52 | 1.477 | 266 |
| Extent9: Concerned about cyber security (Password protection and hacking) | Male | 2.25 | 1.355 | 131 |
| | Female | 2.14 | 1.045 | 135 |
| | **Total** | 2.2 | 1.207 | 266 |
| Extent10: In-class use of mobile devices is distracting to students | Male | 3.39 | 1.615 | 131 |
| | Female | 3.54 | 1.465 | 135 |
| | **Total** | 3.47 | 1.54 | 266 |
| Extent11: In-class use of mobile devices is distracting to teachers | Male | 2.69 | 1.555 | 131 |
| | Female | 2.94 | 1.592 | 135 |
| | **Total** | 2.82 | 1.576 | 266 |
| Extent12: Use of tablets/laptops in class improves engagement with the content and class | Male | 2.63 | 1.48 | 131 |
| | Female | 2.62 | 1.44 | 135 |
| | **Total** | 2.62 | 1.457 | 266 |
| Extent13: Multitasking with technology sometimes prevents concentration | Male | 2.62 | 1.48 | 131 |
| | Female | 2.6 | 1.452 | 135 |
| | **Total** | 2.61 | 1.463 | 266 |
| Extent14: Students like to keep academic life and social life separate | Male | 2.53 | 1.536 | 131 |
| | Female | 2.31 | 1.357 | 135 |
| | **Total** | 2.42 | 1.45 | 266 |
| Extent15: Students are hoping teachers to integrate technology into teachings | Male | 2.63 | 1.575 | 131 |
| | Female | 2.59 | 1.452 | 135 |
| | **Total** | 2.61 | 1.511 | 266 |

The CCJE college had the greatest mean in terms of statements 1, 4, 6, 9, 11, 12, 13, 14, and 15. The impact of learners' perspectives under assertions 2 and 3 had the greatest mean in the College of Arts and Sciences department. However, when it came to the degree to which technology was perceived as impeding students' capacity to focus and think deeply about the subject, the College of Business and Management and Maritime Education Program have the same average. On the other hand, students from CAS and the College of Education (COE) responded to the interruptions in class caused by the use of mobile devices the most.

Rupak, Greg, Jei & Ben [9] found that technology had a positive and significant relationship between perceived

usefulness and perceived ease of use, and both elements have a positive effect on behavioral intention. In short, attitude plays an important role in persuading student intention to use online learning [10] because attitude is a vital component in the use of technology [11].

**Table 5: Multivariate analysis of the Department and the extent of the impact of learners' perception of technology used in the classroom**

| Department | | Mean | Std. Deviation | N |
|---|---|---|---|---|
| Extent1: More actively involved in courses that use technology | CAS | 3 | 1.414 | 25 |
| | CBM | 2.91 | 1.252 | 86 |
| | CCJE | 3.38 | 1.334 | 40 |
| | COE | 2.72 | 1.114 | 32 |
| | COT | 2.62 | 1.231 | 34 |
| | MEP | 3.27 | 1.396 | 49 |
| | Total | 2.99 | 1.303 | 266 |
| Extent2: Likely to skip classes when materials from course are available online | CAS | 3.44 | 1.53 | 25 |
| | CBM | 3.09 | 1.289 | 86 |
| | CCJE | 2.85 | 1.001 | 40 |
| | COE | 2.84 | 1.11 | 32 |
| | COT | 2.65 | 1.178 | 34 |
| | MEP | 3.27 | 1.604 | 49 |
| | Total | 3.03 | 1.316 | 266 |
| Extent3: Adequately prepared to use the technology needed in the course | CAS | 3.44 | 1.758 | 25 |
| | CBM | 2.93 | 1.379 | 86 |
| | CCJE | 3.08 | 1.421 | 40 |
| | COE | 3.28 | 1.727 | 32 |
| | COT | 2.71 | 1.36 | 34 |
| | MEP | 3.08 | 1.441 | 49 |
| | Total | 3.04 | 1.478 | 266 |
| Extent4: Technology helps feel connected to what's going on at the college | CAS | 2.12 | 1.166 | 25 |
| | CBM | 2.07 | 1.186 | 86 |
| | CCJE | 2.43 | 1.375 | 40 |
| | COE | 1.88 | 1.129 | 32 |
| | COT | 2.38 | 1.349 | 34 |
| | MEP | 2.82 | 1.752 | 49 |
| | Total | 2.28 | 1.371 | 266 |
| Extent5: Technology makes feel connected to other students | CAS | 2.24 | 1.3 | 25 |
| | CBM | 2.03 | 1.173 | 86 |
| | CCJE | 2.25 | 1.256 | 40 |
| | COE | 2 | 1.244 | 32 |
| | COT | 2.21 | 1.175 | 34 |
| | MEP | 2.51 | 1.622 | 49 |
| | Total | 2.19 | 1.299 | 266 |
| Extent6: Technology makes feel connected to teachers | CAS | 2.08 | 1.187 | 25 |
| | CBM | 2.12 | 1.132 | 86 |
| | CCJE | 2.8 | 1.506 | 40 |
| | COE | 2.31 | 1.424 | 32 |
| | COT | 2.44 | 1.375 | 34 |
| | MEP | 2.73 | 1.591 | 49 |
| | Total | 2.39 | 1.373 | 266 |
| Extent7: Technology interferes with the ability to concentrate and think deeply | CAS | 3.04 | 1.925 | 25 |
| | CBM | 3.16 | 1.586 | 86 |
| | CCJE | 3.1 | 1.336 | 40 |
| | COE | 3.03 | 1.448 | 32 |
| | COT | 2.76 | 1.415 | 34 |
| | MEP | 3.16 | 1.477 | 49 |
| | Total | 3.08 | 1.52 | 266 |
| Extent8: Advances may increasingly invade privacy | CAS | 2.56 | 1.53 | 25 |
| | CBM | 2.52 | 1.477 | 86 |
| | CCJE | 2.7 | 1.488 | 40 |
| | COE | 2.31 | 1.378 | 32 |
| | COT | 2.26 | 1.238 | 34 |
| | MEP | 2.67 | 1.676 | 49 |
| | Total | 2.52 | 1.477 | 266 |
| Extent9: Concerned about cyber security (Password protection and hacking) | CAS | 2.04 | 1.098 | 25 |
| | CBM | 1.99 | 0.964 | 86 |
| | CCJE | 2.65 | 1.733 | 40 |
| | COE | 2.22 | 1.184 | 32 |
| | COT | 2.03 | 0.758 | 34 |
| | MEP | 2.37 | 1.318 | 49 |
| | Total | 2.2 | 1.207 | 266 |
| Extent10: In-class use of mobile devices is distracting to students | CAS | 3.72 | 1.696 | 25 |
| | CBM | 3.45 | 1.531 | 86 |
| | CCJE | 3.63 | 1.334 | 40 |
| | COE | 3.72 | 1.42 | 32 |
| | COT | 3.15 | 1.726 | 34 |
| | MEP | 3.29 | 1.581 | 49 |
| | Total | 3.47 | 1.54 | 266 |
| Extent11: In-class use of mobile devices is distracting to teachers | CAS | 2.64 | 1.551 | 25 |
| | CBM | 2.72 | 1.569 | 86 |
| | CCJE | 3.33 | 1.67 | 40 |
| | COE | 3.03 | 1.616 | 32 |
| | COT | 2.15 | 1.077 | 34 |
| | MEP | 2.98 | 1.664 | 49 |
| | Total | 2.82 | 1.576 | 266 |
| Extent12: Use of tablets/laptops in class improves engagement with the content and class | CAS | 2.32 | 1.249 | 25 |
| | CBM | 2.49 | 1.387 | 86 |
| | CCJE | 3.3 | 1.556 | 40 |
| | COE | 2.59 | 1.456 | 32 |
| | COT | 2.32 | 1.273 | 34 |
| | MEP | 2.69 | 1.597 | 49 |
| | Total | 2.62 | 1.457 | 266 |
| Extent13: Multitasking with technology sometimes prevents concentration | CAS | 2.36 | 1.319 | 25 |
| | CBM | 2.5 | 1.445 | 86 |
| | CCJE | 3.1 | 1.482 | 40 |
| | COE | 2.47 | 1.414 | 32 |
| | COT | 2.26 | 1.31 | 34 |
| | MEP | 2.86 | 1.607 | 49 |
| | Total | 2.61 | 1.463 | 266 |
| Extent14: Students like to keep academic life and social life separate | CAS | 2 | 1.225 | 25 |
| | CBM | 2.19 | 1.324 | 86 |
| | CCJE | 2.9 | 1.614 | 40 |
| | COE | 2.56 | 1.48 | 32 |
| | COT | 2.24 | 1.208 | 34 |
| | MEP | 2.69 | 1.648 | 49 |
| | Total | 2.42 | 1.45 | 266 |
| Extent15: Students are hoping teachers to integrate technology into teachings | CAS | 2.48 | 1.418 | 25 |
| | CBM | 2.56 | 1.468 | 86 |
| | CCJE | 3.15 | 1.578 | 40 |
| | COE | 2.22 | 1.289 | 32 |
| | COT | 2.47 | 1.482 | 34 |
| | MEP | 2.67 | 1.676 | 49 |
| | Total | 2.61 | 1.511 | 266 |

Using a multivariate analysis of variance (MANOVA), a recent study on the influence of technology integration in the classroom on student perceptions showed substantial findings. The study examined the perceptions of students from various departments about the effectiveness of various forms of technology-based learning activities. It showed that depending on the kind of activity students engaged in—such as internships, case studies, projects, and videos—their learning results differed considerably. For example, students believed that industry-related experiences and internships were the best ways to improve their learning, especially when it came to gaining practical skills. This implies that incorporating practical, real-world technological applications might greatly enhance learning results and student engagement.

The study demonstrated how technology, such as online resources and audiovisual materials, may adapt to different learning requirements and styles, providing inclusive, individualized, and accessible learning opportunities. To minimize the negative implications of an over-reliance on

technology, like as diversions and data privacy issues, it also underlined the necessity of careful planning and sufficient teacher preparation [12].

The multivariate main effect of gender is presented in Table 6. The analysis of this variable resulted in a Wilk's Lambda value = .879, which is subsequently translated into an *F* value of 1.596 and evaluated at degrees of freedom of 21 for between two groups hypothesis and error within groups of 244. This *F (p=0.05)* was significant *(p<0.5),* indicating differences between the two genders and the dependent variables. The partial eta-squared value showed that this effect accounts for 12% of the total variance.

**Table 6: Multivariate main effect of Gender via Wilks' Lambda Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | 0.947 | 208.865[b] | 21 | 244 | 0 | 0.947 |
| | Wilks' Lambda | 0.053 | 208.865[b] | 21 | 244 | 0 | 0.947 |
| | Hotelling's Trace | 17.976 | 208.865[b] | 21 | 244 | 0 | 0.947 |
| | Roy's Largest Root | 17.976 | 208.865[b] | 21 | 244 | 0 | 0.947 |
| Gender | Pillai's Trace | 0.121 | 1.596[b] | 21 | 244 | 0.051 | 0.121 |
| | Wilks' Lambda | 0.879 | 1.596[b] | 21 | 244 | 0.051 | 0.121 |
| | Hotelling's Trace | 0.137 | 1.596[b] | 21 | 244 | 0.051 | 0.121 |
| | Roy's Largest Root | 0.137 | 1.596[b] | 21 | 244 | 0.051 | 0.121 |

Table 7 displays the Department's multivariate main impact. A Wilk's Lambda value of .589 was obtained from the study of this variable, which was then converted to an *F* value of 1.284 and assessed at 105 degrees of freedom for the error between 6 groups and 1178 degrees of freedom for the error within groups. This *F(p=0.03)* was significant (*p<0.05),* demonstrating differences in the dependent variables and the six departments. According to the partial eta-squared value, this impact was responsible for 10% of the overall variation.

Interaction of Gender and Departments (Independent Variables of the Study)

The combined multivariate effect of (gender*Department) was examined and depicted in Table 8. This interaction produced a Wilk's Lambda value of .635, which was translated into an *F* value of 1.348 and evaluated with degrees of freedom 84 and 931 for between and within groups of degrees of freedom. This *F (p=0.2)* was significant (*p<0.5),* demonstrating differences in the independent variables. According to the partial eta-squared value, this impact was responsible for 11% of the overall variation.

**Table 7: Multivariate main effect of Department via Wilks' Lambda Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | 0.942 | 185.499[b] | 21 | 240 | 0 | 0.942 |
| | Wilks' Lambda | 0.058 | 185.499[b] | 21 | 240 | 0 | 0.942 |
| | Hotelling's Trace | 16.231 | 185.499[b] | 21 | 240 | 0 | 0.942 |
| | Roy's Largest Root | 16.231 | 185.499[b] | 21 | 240 | 0 | 0.942 |
| Department | Pillai's Trace | 0.498 | 1.285 | 105 | 1220 | 0.033 | 0.1 |
| | Wilks'Lambda | 0.589 | 1.284 | 105 | 1178.197 | 0.033 | 0.101 |
| | Hotelling's Trace | 0.565 | 1.283 | 105 | 1192 | 0.033 | 0.102 |
| | Roy's Largest Root | 0.185 | 2.155[c] | 21 | 244 | 0.003 | 0.156 |

**Table 8: Multivariate main Effect of Gender and Development via Wilks' Lambda Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | 0.889 | 90.068[b] | 21 | 235 | 0 | 0.889 |
| | Wilks' Lambda | 0.111 | 90.068[b] | 21 | 235 | 0 | 0.889 |
| | Hotelling's Trace | 8.049 | 90.068[b] | 21 | 235 | 0 | 0.889 |
| | Roy's Largest Root | 8.049 | 90.068[b] | 21 | 235 | 0 | 0.889 |
| Department | Pillai's Trace | 0.416 | 1.033 | 105 | 1195 | 0.394 | 0.083 |
| | Wilks' Lambda | 0.643 | 1.037 | 105 | 1153.8 | 0.385 | 0.084 |
| | Hotelling's Trace | 0.468 | 1.041 | 105 | 1167 | 0.375 | 0.086 |
| | Roy's Largest Root | 0.183 | 2.078[c] | 21 | 239 | 0.005 | 0.154 |
| Gender | Pillai's Trace | 0.092 | 1.136[b] | 21 | 235 | 0.311 | 0.092 |
| | Wilks' Lambda | 0.908 | 1.136[b] | 21 | 235 | 0.311 | 0.092 |
| | Hotelling's Trace | 0.102 | 1.136[b] | 21 | 235 | 0.311 | 0.092 |
| | Roy's Largest Root | 0.102 | 1.136[b] | 21 | 235 | 0.311 | 0.092 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Department * Gender | Pillai's Trace | 0.425 | 1.346 | 84 | 952 | 0.025 | 0.106 |
| | Wilks' Lambda | 0.635 | 1.348 | 84 | 930.68 | 0.024 | 0.107 |
| | Hotelling's Trace | 0.485 | 1.349 | 84 | 934 | 0.024 | 0.108 |
| | Roy's Largest Root | 0.173 | 1.962[c] | 21 | 238 | 0.009 | 0.148 |

Use of Analysis of Variance (ANOVA)

ANOVA was used to evaluate how well independent factors interacted with dependent variables.

Tables 9, 10, 11, and 12 depict the Analysis of variance (ANOVA) for the independent variables (Gender and Department) and their interactions with the dependent variables (Student's Perception of technology and the extent of the impact of learner's perception of technology in the classroom). The data in combination with the previous findings reflects that females were shown to score higher on the Student's Perception of technology than men, as shown in Table 9. Thus, the value of p=0.020 was the only one that male perception 3 is statistically significant.

**Table 9: Analysis of variance between Gender and Students' Perception of Technology**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Perception 1 | Between Groups | 2.089 | 1 | 2.089 | 0.983 | 0.322 |
| | Within Groups | 560.982 | 264 | 2.125 | | |
| | Total | 563.071 | 265 | | | |
| Perception 2 | Between Groups | 0.059 | 1 | 0.059 | 0.028 | 0.867 |
| | Within Groups | 553.042 | 264 | 2.095 | | |
| | Total | 553.102 | 265 | | | |
| Perception 3 | Between Groups | 11.487 | 1 | 11.487 | 5.476 | 0.02 |
| | Within Groups | 553.795 | 264 | 2.098 | | |
| | Total | 565.282 | 265 | | | |
| Perception 4 | Between Groups | 0.501 | 1 | 0.501 | 0.237 | 0.627 |
| | Within Groups | 557.127 | 264 | 2.11 | | |
| | Total | 557.628 | 265 | | | |
| Perception 5 | Between Groups | 1.088 | 1 | 1.088 | 0.523 | 0.47 |
| | Within Groups | 548.536 | 264 | 2.078 | | |
| | Total | 549.624 | 265 | | | |
| Perception 6 | Between Groups | 2.975 | 1 | 2.975 | 0.794 | 0.374 |
| | Within Groups | 988.878 | 264 | 3.746 | | |
| | Total | 991.853 | 265 | | | |

The results of these kinds of studies typically show that while female students tend to show more varied preferences, influenced by things like perceived utility and enjoyment of the technology, male students may demonstrate higher levels of engagement with specific technology types, especially in STEM-related fields [13]. This was consistent with broader patterns that suggest female students may give technology higher ratings when it fits their collaborative or social learning preferences.

According to another research, the absence of female role models in tech-related areas may also have an impact on how female students view their technological ability [14]. A gendered experience of technology in the classroom may arise from this view, which may influence their desire to learn more in technologically demanding settings.

Table 10's results combined with earlier ones, revealed that the College of Arts and Sciences was found to have a greater level of student impression of technology use in their studies. Only perceptions 3 and 6 were statistically significant (p=0.042 and 0.043, respectively).

**Table 10: Analysis of Variance between Department and Students' Perception of Technology**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Perception1 | Between Groups | 10.067 | 5 | 2.013 | 0.947 | 0.451 |
| | Within Groups | 553.005 | 260 | 2.127 | | |
| | Total | 563.071 | 265 | | | |
| Perception2 | Between Groups | 6.074 | 5 | 1.215 | 0.577 | 0.717 |
| | Within Groups | 547.028 | 260 | 2.104 | | |
| | Total | 553.102 | 265 | | | |
| Perception3 | Between Groups | 24.398 | 5 | 4.88 | 2.346 | 0.042 |
| | Within Groups | 540.884 | 260 | 2.08 | | |
| | Total | 565.282 | 265 | | | |
| Perception4 | Between Groups | 9.723 | 5 | 1.945 | 0.923 | 0.467 |
| | Within Groups | 547.905 | 260 | 2.107 | | |
| | Total | 557.628 | 265 | | | |
| Perception5 | Between Groups | 12.79 | 5 | 2.558 | 1.239 | 0.291 |
| | Within Groups | 536.834 | 260 | 2.065 | | |
| | Total | 549.624 | 265 | | | |
| Perception6 | Between Groups | 42.535 | 5 | 8.507 | 2.33 | 0.043 |
| | Within Groups | 949.318 | 260 | 3.651 | | |
| | Total | 991.853 | 265 | | | |

Comparing male and female respondents, Table 11 showed that male respondents were more concerned about how students would perceive the usage of technology in the classroom. The outcomes were the same as it was in the earlier tables. Thus, only extent statements 4 and 6 (p=0.002 and 0.039) were statistically significant.

**Table 11: Analysis of Variance between Gender and the Extent of the Impact of Learners' perception of technology used in the classroom**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Extent1 | Between Groups | 3.843 | 1 | 3.843 | 2.27 | 0.133 |
| | Within Groups | 446.142 | 264 | 1.69 | | |
| | Total | 449.985 | 265 | | | |
| Extent2 | Between Groups | 1.069 | 1 | 1.069 | 0.62 | 0.433 |
| | Within Groups | 457.626 | 264 | 1.733 | | |
| | Total | 458.695 | 265 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Extent3 | Between Groups | 2.775 | 1 | 2.775 | 1.27 | 0.26 |
| | Within Groups | 575.77 | 264 | 2.181 | | |
| | Total | 578.545 | 265 | | | |
| Extent4 | Between Groups | 17.453 | 1 | 17.453 | 9.59 | 0.002 |
| | Within Groups | 480.401 | 264 | 1.82 | | |
| | Total | 497.853 | 265 | | | |
| Extent5 | Between Groups | 7.203 | 1 | 7.203 | 4.32 | 0.039 |
| | Within Groups | 440.019 | 264 | 1.667 | | |
| | Total | 447.222 | 265 | | | |
| Extent6 | Between Groups | 6.192 | 1 | 6.192 | 3.31 | 0.07 |
| | Within Groups | 493.361 | 264 | 1.869 | | |
| | Total | 499.553 | 265 | | | |
| Extent7 | Between Groups | 2.601 | 1 | 2.601 | 1.13 | 0.29 |
| | Within Groups | 609.895 | 264 | 2.31 | | |
| | Total | 612.496 | 265 | | | |
| Extent8 | Between Groups | 0.004 | 1 | 0.004 | 0 | 0.964 |
| | Within Groups | 578.36 | 264 | 2.191 | | |
| | Total | 578.365 | 265 | | | |
| Extent9 | Between Groups | 0.822 | 1 | 0.822 | 0.56 | 0.454 |
| | Within Groups | 385.013 | 264 | 1.458 | | |
| | Total | 385.835 | 265 | | | |
| Extent10 | Between Groups | 1.525 | 1 | 1.525 | 0.64 | 0.424 |
| | Within Groups | 626.671 | 264 | 2.374 | | |
| | Total | 628.195 | 265 | | | |
| Extent11 | Between Groups | 4.28 | 1 | 4.28 | 1.73 | 0.19 |
| | Within Groups | 653.694 | 264 | 2.476 | | |
| | Total | 657.974 | 265 | | | |
| Extent12 | Between Groups | 0.001 | 1 | 0.001 | 0 | 0.983 |
| | Within Groups | 562.405 | 264 | 2.13 | | |
| | Total | 562.406 | 265 | | | |
| Extent13 | Between Groups | 0.022 | 1 | 0.022 | 0.01 | 0.919 |
| | Within Groups | 567.316 | 264 | 2.149 | | |
| | Total | 567.338 | 265 | | | |
| Extent14 | Between Groups | 3.313 | 1 | 3.313 | 1.58 | 0.21 |
| | Within Groups | 553.529 | 264 | 2.097 | | |
| | Total | 556.842 | 265 | | | |
| Extent15 | Between Groups | 0.074 | 1 | 0.074 | 0.03 | 0.858 |
| | Within Groups | 605.264 | 264 | 2.293 | | |
| | Total | 605.338 | 265 | | | |

Combining Table 12 with the above data revealed that CCJE was found to have a greater mean in terms of the magnitude of the influence on students' perceptions of technology employed in the classroom. Thus, Statements under Extent 4 (p=0.019), Extent 6 (p=0.41), Extent 11 (p=0.033), Extent 12 (0.033), Extent 12 (p=0.033) and Extent 14 (P=0.043) are statistically significant.

**Table 12: Analysis of Variance between Departments and the Extent of the Impact of Learners' perception of technology used in the classroom**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Extent1 | Between Groups | 17.305 | 5 | 3.461 | 2.08 | 0.068 |
| | Within Groups | 432.68 | 260 | 1.664 | | |
| | Total | 449.985 | 265 | | | |
| Extent2 | Between Groups | 14.645 | 5 | 2.929 | 1.715 | 0.131 |
| | Within Groups | 444.05 | 260 | 1.708 | | |
| | Total | 458.695 | 265 | | | |
| Extent3 | Between Groups | 10.828 | 5 | 2.166 | 0.992 | 0.423 |
| | Within Groups | 567.717 | 260 | 2.184 | | |
| | Total | 578.545 | 265 | | | |
| Extent4 | Between Groups | 24.981 | 5 | 4.996 | 2.747 | 0.019 |
| | Within Groups | 472.873 | 260 | 1.819 | | |
| | Total | 497.853 | 265 | | | |
| Extent5 | Between Groups | 8.463 | 5 | 1.693 | 1.003 | 0.416 |
| | Within Groups | 438.759 | 260 | 1.688 | | |
| | Total | 447.222 | 265 | | | |
| Extent6 | Between Groups | 21.667 | 5 | 4.333 | 2.358 | 0.041 |
| | Within Groups | 477.886 | 260 | 1.838 | | |
| | Total | 499.553 | 265 | | | |
| Extent7 | Between Groups | 4.435 | 5 | 0.887 | 0.379 | 0.863 |
| | Within Groups | 608.061 | 260 | 2.339 | | |
| | Total | 612.496 | 265 | | | |
| Extent8 | Between Groups | 6.083 | 5 | 1.217 | 0.553 | 0.736 |
| | Within Groups | 572.282 | 260 | 2.201 | | |
| | Total | 578.365 | 265 | | | |
| Extent9 | Between Groups | 14.959 | 5 | 2.992 | 2.097 | 0.066 |
| | Within Groups | 370.875 | 260 | 1.426 | | |
| | Total | 385.835 | 265 | | | |
| Extent10 | Between Groups | 9.733 | 5 | 1.947 | 0.818 | 0.537 |
| | Within Groups | 618.462 | 260 | 2.379 | | |
| | Total | 628.195 | 265 | | | |
| Extent11 | Between Groups | 29.923 | 5 | 5.985 | 2.478 | 0.033 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | 628.05 | 260 | 2.416 | | |
| | Total | 657.974 | 265 | | | |
| Extent12 | Between Groups | 25.51 | 5 | 5.102 | 2.471 | 0.033 |
| | Within Groups | 536.896 | 260 | 2.065 | | |
| | Total | 562.406 | 265 | | | |
| Extent13 | Between Groups | 19.892 | 5 | 3.978 | 1.889 | 0.096 |
| | Within Groups | 547.446 | 260 | 2.106 | | |
| | Total | 567.338 | 265 | | | |
| Extent14 | Between Groups | 23.818 | 5 | 4.764 | 2.324 | 0.043 |
| | Within Groups | 533.024 | 260 | 2.05 | | |
| | Total | 556.842 | 265 | | | |
| Extent15 | Between Groups | 18.074 | 5 | 3.615 | 1.6 | 0.16 |
| | Within Groups | 587.264 | 260 | 2.259 | | |
| | Total | 605.338 | 265 | | | |

## 4. Results and Discussion

The purpose of this study was to ascertain if there is any correlation between the independent factors of gender and department and the dependent variables of students' technological perception and the magnitude of that perception's influence on learning. The two–way factorial MANOVA findings show that there is a multivariate link between the variables with respect to the research. According to the tables, there was a statistical relationship between the independent variable combination and the variables themselves. However, it is important to account for many factors that contribute to the learning preferences of students on the use of technology. There were some intriguing correlations between students' preferred methods of learning and how they rated various technological applications. These overarching conclusions are supported and clarified by responses to the open-ended questions (Shuel and Farber 2001).

Findings did determine that a significant relationship does exist in the study between independent and dependent variables. In studies, female respondents showed a higher level of perception in the use of technology compared to male respondents, however, this difference between genders was diminished when it came to how much of an influence students' perception of the use of technology in the classroom have, with male respondents that showed higher mean values across the board. Nonetheless, when considering the connection between the department and the two dependent variables. According to the survey, when it comes to students' perceptions of using technology for their studies, the College of Arts and Sciences had the highest mean when compared to other departments. In contrast to other departments, the Colleges of Criminal Justice Education have the highest mean when it comes to the degree to which students' perceptions of the use of technology in the classroom influence their learning.

Lastly, the implementation of a multivariate design provided a rich context for exploring multiple variables associated with the student's perception of technology and the extent of the impact of learners' perception of technology used in the classroom.

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