



A STUDY ON ENGINEERING STUDENTS' COLLABORATIVE PROJECT DEVELOPMENT SKILLS

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Abstract

- The use of technology by educational institutions and students has increased dramatically in recent years
- Engineering education, in particular, focuses on techniques that help students gain Industry 4.0 skills. Students should learn to merge their technical abilities with computer skills as well as learn to operate in a collaborative setting as a result of this transition.
- The use of digital tools to improve teamwork and carry out group tasks effectively is becoming a standard aspect of engineering education.
- These online collaboration tools assist students in developing a functioning model for completing their projects successfully.
- This research project presents a state-of-the-art examining how current engineering education handles computational needs and combines Industry 4.0 skills.
- The use and impact of computational tools, as well as the use of online collaboration platforms in engineering education, were investigated in this conceptual study.
- This research study involved students and instructors from several engineering and computer science programs, and the data gathered from the research was examined.

Research Methodology

- Descriptive, quantitative, and qualitative research methods were used in the study.
- In order to undertake an in-depth investigation of the given topic and its surrounding components, this research endeavor used surveys as a research approach.
- Research will involve collecting quantitative and qualitative data through surveys, which can then be evaluated using descriptive and inferential statistics.
- The Chi Square statistic and Qualtrics are used in this study to analyze correlations between categorical data.
- The data was gathered from a small group of instructors and students at WTAMU's College of Engineering.
- The online Qualtrics survey software was used to obtain the primary data needed for this study.
- Secondary data for the study was gathered from a variety of sources, including journals, conference proceedings, online services, and previous thesis work.
- A pilot study was conducted after the questionnaire was developed.
- A very small percentage of the population was chosen. The instrument was modified in accordance with the responses to the surveys as well as the suggestions of the respondents. The questionnaire was then completed.

Analysis of Results

- The majority of instructor respondents were Assistant Professors in electrical engineering, and the majority of student respondents were in the computer science undergraduate program.
- In addition, the proportion of male and female students who responded was determined to be equal.
- It may be inferred from Fig. 1 that the majority of instructor respondents utilize laptops and desktop computers for educational purposes.

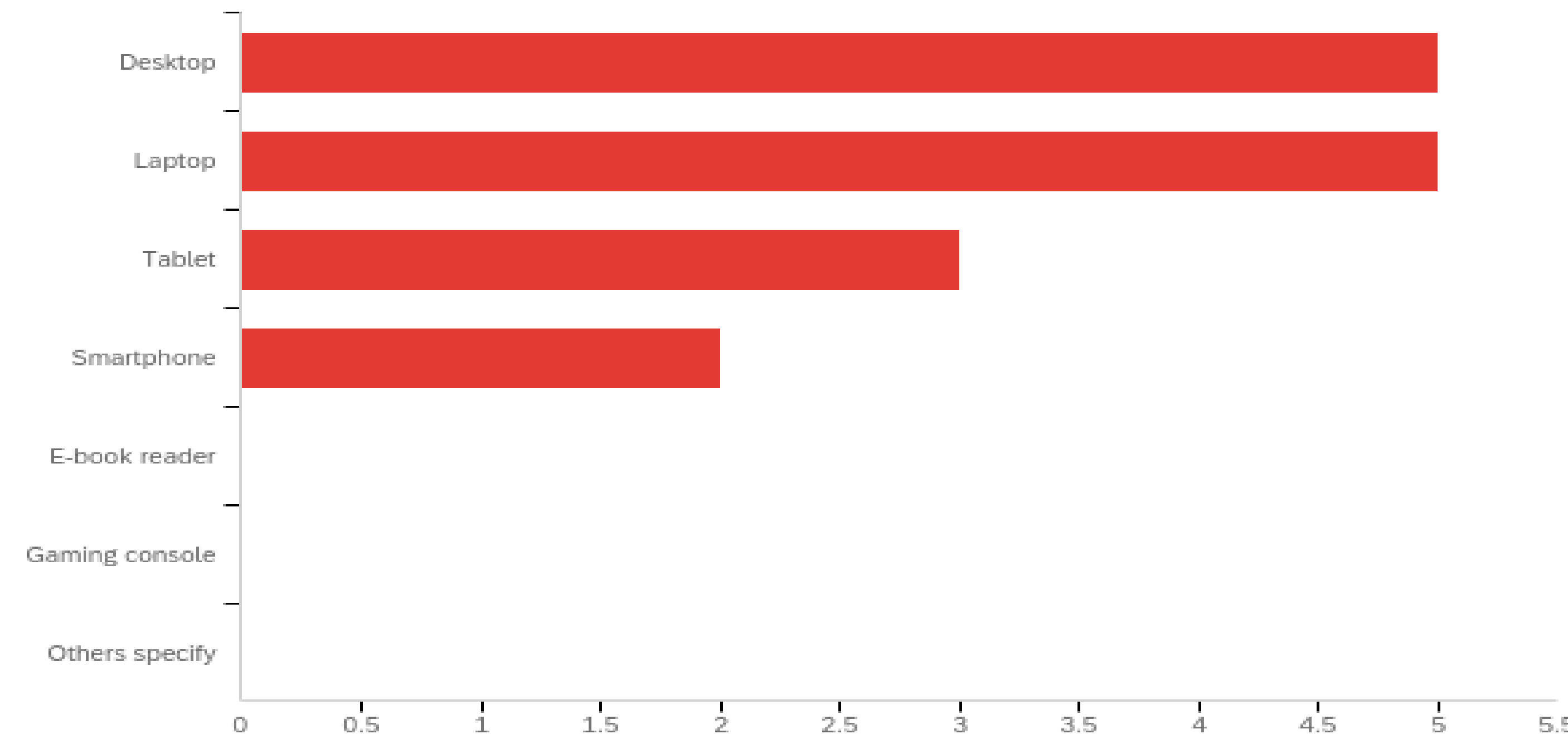


Fig 1. The digital device use for educational purpose- Instructor

- From Fig. 2 it is inferred that majority of the student respondents own smartphone digital devices and use laptop for educational purpose.

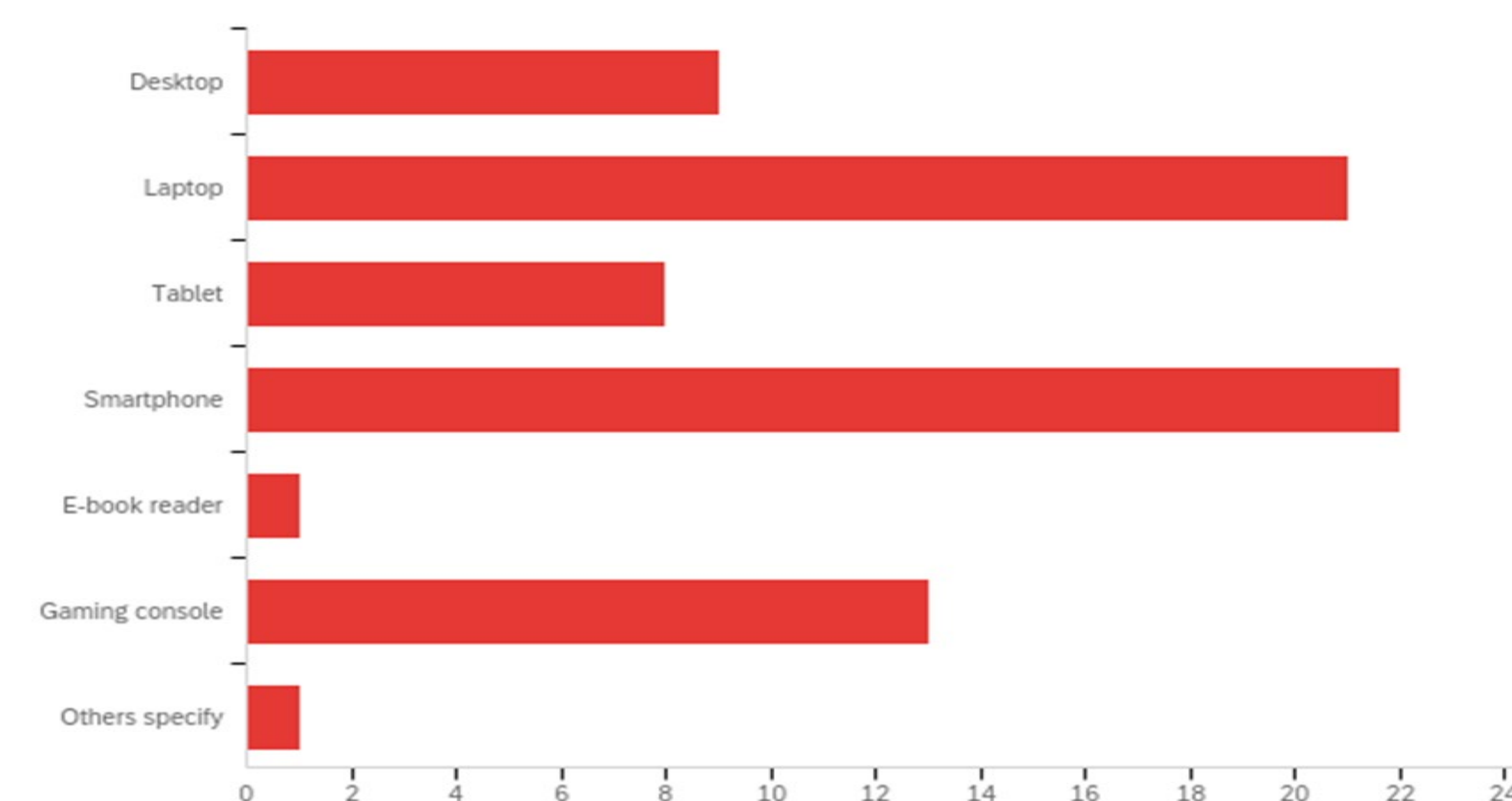


Fig 2. The digital device use for educational purpose- Student

Inferences:

- The instructors who responded are neither extremely nor relatively comfortable with using technology in the classroom.
- The majority of student responders use a digital device to check WTCLASS course postings.
- The vast majority of student and instructor responders had never heard of Industry 4.0 principles.

Key findings

Industry 4.0

- Big data, autonomous robotics, simulation, universal system integration, industrial IoT, cybersecurity, cloud computing, additive manufacturing, and augmented reality, according to instructors, were utilized on a moderate level within their subject area / courses.
- When it came to simulations, both teachers and students agreed that the software tools were used at a moderate degree.
- Within the courses, student respondents have employed Industry 4.0 to a moderate extent. On the other hand, they haven't used the Industry 4.0 pillars of universal system integration, industrial IoT, cloud computing, additive manufacturing, or augmented reality.

Soft Skills

- In the courses they have taught or taken, both instructors and students agree that they have employed the following top rated skills on a relatively proficient level.
- Complex problem solving, critical thinking, creativity, people management, collaboration, emotional intelligence, judgment and decision making, and service orientation are some of the skills required.

Collaborative Project Development

- Approximately 60% of professors say they have pushed their students to use software tools in collaborative project development.
- In at least one of their courses, 93 percent of students indicate they worked on collaborative project development or team-based project development..

Conclusion & Future Work

- The survey helped collect shared information from both the instructors' and students' perspectives, providing for a high level of reference.
- The findings aided in the creation of a common understanding of the issues and current gap in the undergraduate engineering curriculum when it comes to adapting Industry 4.0 skill sets.
- It is suggested that future curriculum adjustments and course enhancements be made following a thorough study and assessment of the existing courses

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