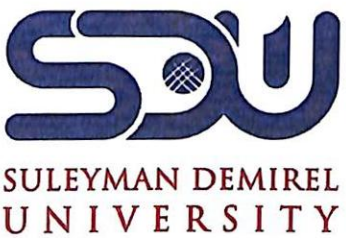
Ministry of Science and Higher Education of the Republic of Kazakhstan

Suleyman Demirel University



Yelnur Mutaliyev

Higher education students' English language level and engagement correlation in programming courses

THESIS

Presented in Partial Fulfilment for the

Master of Technical Sciences Degree in Computer Science

(degree code: 7M06102)

Department of Computer Science

Faculty of Engineering and Natural Sciences

Supervisor: **Akerke Alseitova**

Kaskelen 2023

Suleyman Demirel University
Faculty of Engineering and Natural Sciences
Department of Computer Science

Dean of Faculty

Associate Professor

PhD Zhamanov A.

«06» 06 2023

Topic of the thesis:

Higher education students' English language level and engagement correlation in programming courses

Thesis submitted as part of the requirements for the award of the MSc in "7M06102 - Computer Science" SDU, 2021-2023

Head of Department _____ Assistant Professor, PhD Mukash Zh.

Academic Supervisor _____ Akerke Alseitova

Master student _____ Mutaliyev Yelnur

Kaskelen 2023

Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Yelnur Mutaliyev

2023

Acknowledgements

I would like to extend my sincere appreciation to my supervisor Akerke Alseitova, for all of his help and support during the completion of this diploma work. Your meticulousness, commitment, and technological know-how have been essential to the smooth development of our study. I appreciate all of your efforts and the many hours you have put into this project.

Dedication

I wanna thank me, I wanna thank me for believing in me, I wanna thank me for doing all this hard work, I wanna thank me for having no days off, I wanna thank me for, for never quitting, I wanna thank me for always being a giver, And tryna give more than I recieve, I wanna thank me for tryna do more right than wrong, I wanna thank me for just being me at all times

Abstract

This is a draft of Abstract.

This thesis tries to find out if there is a link between how well students know English and how much they participate in the computer class at university. The introduction to the topic gives a general idea of how English is used in Kazakhstan. The literature study talks about things like engagement and how English is used in Kazakhstan. It also defines engagement and talks about tools like Google Forms.

As part of the study method, a poll will be given to students and their answers will be analyzed. Also, grades were used in the study, and the link between English level and end course grade was looked at. The method that was used to find this connection is explained.

As a result of the work, it was found that how well a student knows English has a big effect on how involved they are in the learning process in a computer class. Given how important the English language is in computing, the results give real suggestions for how to improve the level of education and the efficiency of training.

Аңдатпа

Бұл дипломдық жұмыс ағылшын тілін білу деңгейі мен студенттердің университеттегі бағдарламалау курсына қатысуы арасындағы байланысты зерттейді. Тақырыпқа кіріспе Қазақстандағы ағылшын тіліндегі тілдік жағдайға шолу жасайды. Әдеби шолу тарту, Қазақстанда ағылшын тілін қолдану сияқты тақырыптарды қамтиды, сондай-ақ қатысу анықтамалары мен Google Forms сияқты құралдарды ұсынады.

Зерттеу әдістемесі студенттер арасында сауалнама жүргізуді және алынған жауаптарды талдауды қамтиды. Талдау сонымен қатар бағаларды қолдану арқылы жүзеге асырылады және ағылшын тілі деңгейі мен курстың соңғы бағалары арасындағы байланыс зерттеледі. Бұл қатынасты анықтау үшін қолданылатын алгоритм сипатталған.

Жұмыс нәтижесінде ағылшын тілін білу деңгейі студенттердің бағдарламалау курсындағы оқу процесіне қатысуына айтарлықтай әсер ететіні анықталды. Алынған нәтижелер ағылшын тілінің осы саладағы маңыздылығын ескере отырып, бағдарламалау контекстінде білім беру сапасы мен оқытудың тиімділігін жақсарту үшін практикалық ұсыныстар береді.

Аннотация

Данная дипломная работа исследует взаимосвязь между уровнем знания английского языка и вовлеченностью студентов на курсе программирования в вузе. Введение в тему предоставляет обзор языковой ситуации с английским языком в Казахстане. Литературный обзор охватывает такие темы, как вовлеченность, использование английского языка в Казахстане, а также представляет определения вовлеченности и инструменты, такие как Google Forms.

Методология исследования включает проведение опроса среди студентов и анализ полученных ответов. Анализ также осуществлен с использованием оценок, и исследована взаимосвязь между уровнем английского языка и окончательными оценками за курс. Описан используемый алгоритм для выявления этой взаимосвязи.

В результате работы было выявлено, что уровень знания английского языка имеет значительное влияние на вовлеченность студентов в учебный процесс на курсе программирования. Полученные результаты предоставляют практические рекомендации для улучшения качества образования и эффективности преподавания в контексте программирования, учитывая значимость английского языка в данной области.

Abbreviations

EMI - English medium instruction

EFL - English as a Foreign Language

iOS - iPhone operating system

OECD - The Organization for Economic Cooperation and Development

CEC - Continuing Education Center

Table of Contents

Chapter 1

Introduction

In today's information culture, when expertise in English and programming is required across a wide range of areas of endeavor, these abilities are especially important in higher education. English is not the predominant language in many countries, which might have an influence on the effectiveness of university programming training. Students with low levels of English proficiency may find it difficult to learn programming and engage in the learning process.

Learning to program requires the ability to read and interpret documentation, seek material on the Internet, and interact successfully with other programmers and lecturers, in addition to technical expertise. Typically, these information and materials are only accessible in English. As a result, English competence may have a significant impact on the establishment of a successful programming course as well as student participation in the learning process.

Low English proficiency among students can result in a variety of issues. First, students may have trouble comprehending lectures and reading educational materials written in English. Programming terminology and specific concepts may be incomprehensible to students, making material assimilation challenging. A lack of comprehension of the concepts and instructions in English can reduce the level of course mastery and student engagement in the learning process.

Second, limited language skills can hinder students' ability to communicate with instructors and peers both inside and outside of the classroom. Important

to the learning process is the discussion and exchange of ideas; however, a lack of English proficiency can prevent students from actively participating in such discussions. Communication within initiatives and collaborations can also be hindered by language barriers, which can negatively impact cooperation and the accomplishment of shared objectives.

The study of the relationship between the level of knowledge of the English language and the involvement of students in the programming course at the university is important for improving the educational process. Understanding this relationship can help develop strategies and methodologies specifically tailored for students with a low level of English in order to increase their engagement and success in learning to code. The notion of multilingual education has been centered on in-depth study of the national Kazakh language, international Russian language, and English as an international communication language. Professionally focused language training is given particular attention in order to develop professionals who are fluent in three languages, which adheres to the Law "On languages in the Republic of Kazakhstan" and will surely boost the competitiveness of experts [1].

1.1 Motivation

The selection of this topic was motivated by the observation of the poor performance and relative inactivity of students with a low level of English in the classroom. The goal of this research is to find out if a lack of English proficiency is the primary cause of poor academic performance and minimal student engagement in programming classes.

Students with limited English proficiency have difficulty understanding lectures, perusing additional literature, and learning programming-related terminology, according to preliminary data. This can result in a decline in assignment quality and poor grades. It has also been observed that students with a low level of English are less likely to pose questions and exhibit less classroom activity, which may have a negative influence on their overall effectiveness in teaching programming.

This topic was chosen based on my desire to improve students' knowledge and skills, as well as to train personnel who can compete on the global labor market.

In today's information society, where programming and the IT industry play a crucial role, English proficiency is becoming a prerequisite for career success and the growth of professional skills. My goal is to increase the quality of education in the field of programming so that students are better able to master new technologies, participate in international initiatives, and collaborate with international colleagues.

Consequently, by elucidating the relationship between the level of English language proficiency and the performance of students in the programming course, this study can contribute to the development of effective educational programs aimed at enhancing the language skills of students, thereby enhancing their competitiveness on the international market and preparing more qualified personnel for the field. Information technologies and programming.

1.2 Aims and Objectives

Within this broad objective, the following specific research objectives can be identified: Evaluate the students' performance in a programming course. A grade analysis will disclose trends and relationships between the level of English proficiency and the teaching programming success of students. Determine the extent of English proficiency among university students enrolled in a programming course. This evaluation encompasses vocabulary, grammar, listening, reading, and speaking abilities.

The purpose of these studies is to provide evidence and recommendations that will assist educators and university administrators in optimizing the educational process and creating conditions for the effective instruction of programming students, regardless of their English proficiency level.

In addition, it is essential to observe that the results of the study will help us determine whether low English proficiency is the primary cause of students' poor academic performance and lack of engagement in programming classes. We will be able to build and provide appropriate guidance and support systems to assist students get through language barriers and produce better programming results if this link is proved.

Even if the study does not find a direct link between English language proficiency and student accomplishment, the data gathered will be beneficial. They will assist us in distinguishing this factor from a number of others that may have an influence on student performance and involvement in programming instruction. As a consequence, we will be able to identify additional components that need to be investigated and improved in order to enhance student learning outcomes.

The project will enhance our knowledge of the difficulties associated with language barriers, their influence on student accomplishment and engagement in a programming course, and give ideas and techniques to optimize the learning process and improve educational quality in this subject.

An study of the information gathered via student surveys and questionnaires is part of the inquiry. Evaluation of students' English language skills and success in the programming course may be a crucial component of the research. This will reveal how these two factors are related and show how English proficiency affects student engagement and performance. Also take into account how English language instruction and other language programs affect students' involvement. Experiments in which one group of students receives additional English language instruction and another group does not can help determine the efficacy and impact of this strategy on student engagement and success.

The attained research results are applicable to the educational system, contributing to more effective programming instruction and the training of highly qualified personnel in the field of information technology. Recommendations based on research may include the development of specialized English language courses, the incorporation of English-language materials and resources into the learning process, and the provision of access to English-language educational platforms and online courses.

Consequently, carrying out research on the association between English language competency and student participation in a programming course will allow for a deeper understanding of the impact of language skills on learning efficiency and the development of specific measures to enhance student success in this area.

When performing scientific study on this issue, the following questions should

be addressed:

1. What is the English language competency of university students enrolled in a programming course?
2. How are students doing in this programming course?
3. What is the level of student participation in programming lessons?
4. Is there a link between English competence and student success in a programming class?
5. What factors contribute to poor academic achievement and student inactivity in programming classes?
6. What obstacles can students with limited English competence face?

The responses to these questions will aid in understanding the link between English proficiency and student success in the programming course, as well as identifying variables that influence student involvement in the classroom.

1.3 Thesis outline

Introduction section, provided a brief background about topic that I am studying. Explanation of its significance and relevance in the context of my field. Conducted a comprehensive review of relevant literature related to my topic. Discussed the role and importance of the English language, particularly in the context of my research. Explored various aspects of engagement, such as its definition, theoretical frameworks, and its implications within my research domain. The methodology part for data collection and analysis. Explanation how I utilized Google Forms to gather data for my study. Elaborate on the design of my survey, information about participants. Description of the data analysis techniques employed to analyze the collected data. Presented an overview of the problem that I investigated and discussion of the results obtained from my analysis. Interpretation of the results, discussion of the implications of the results within the broader context of my research. Summarize of the key findings and conclusions derived from my study. Discussion of the significance of these findings in relation to the

existing body of knowledge. Also included future research directions, suggesting areas for further exploration and improvement based on the insights gained from my study.

Chapter 2

Literature review

2.1 English language in Kazakhstan

Education trilingualism is a significant strategic policy in Kazakhstan.The initiative was first debated in 2006, and its implementation was conducted in accordance with the Roadmap for the Development of Trilingual Education for 2015-2020 until the end of 2020. In accordance with the program, Kazakh, Russian, and English are the three languages taught in Kazakhstan institutions. The educational system is structured so that students acquire the fundamentals of the national language (Kazakh) and the Russian language in the primary grades. Then, in secondary school, English is introduced to the curriculum [2].

In Kazakhstani education, trilingualism is a long-term process requiring joint efforts from the government, educational institutions, instructors, and society as a whole. It promotes multilingualism and cultural diversity in Kazakhstan and prepares a new generation of citizens for global opportunities and challenges [2].

First [3] article discusses the significance of multilingual education in the contemporary world and its relevance to Kazakhstan. The authors contend that multilingual education is essential for preparing students for global competition and international cooperation. In addition, they emphasize the difficulties associated with instituting multilingual education in a society with a variety of linguistic and cultural backgrounds.

The authors emphasize the need of studying and analyzing the sociolinguistic and international elements that influence the evolution of multilingualism in Kazakhstan. They say that this kind of study will help figure out what the real state of bilingual education is and write suggestions and comments about how to train people to speak more than one language. The writers also stress how important it is to look at how advanced multilingualism is in countries like Canada, the US, France, Switzerland, Belgium, Finland, Singapore, and Malaysia [3].

Some of the problems with using English as a language of teaching in higher education in Kazakhstan are covered in the article. Some of these problems include the fact that many people do not want to use English as their primary language of instruction, that it is challenging to continue teaching and learning on an international scale, and that English-medium programs must be managed sensibly. The story claims that people are becoming more aware of the possibility that teaching in one's native tongue may be more successful than teaching in two or more languages [4].

The article makes a number of suggestions for how policy should be made in this area. These include giving grants to individuals or groups to develop foreign language curriculum and courses, making support centers for subject-area teachers and foreign language teachers, and changing the standard curriculum to include training for teachers on how to teach in three languages [4].

The next purpose of the study at al-Farabi Kazakh National University was to examine the effect of English-medium instruction (EMI) on students' English proficiency and lecture comprehension. The research query was whether students should focus on acquiring Interdisciplinary or on improving their English. Even though students had a low level of lecture comprehension, they agreed that instruction in English helped them enhance their English proficiency [5].

Even though EMI was hard to implement in Kazakhstan because of language problems, cultural problems, differences in how higher education was run, a lack of English textbooks for some courses, and a lack of professional training for non-English speakers who taught in English, the study found that EMI was a chance to improve English skills, take part in international communication, and get better

prepared for competitions. But more study is needed to come up with ways and tools for using EMI that are suitable and efficient [5].

The next paper says that one of the most important parts of the trilingual strategy is helping Kazakhs learn English. The paper says that there are already well-developed ways to teach English to people of all ages in Kazakhstan, as well as a lot of audio-visual tools and other materials to help people learn English. The paper also talks about how important it is to find specific places where English works in Kazakhstan and to come up with a set of steps to make it easier to carry out the trilingual policy over the next ten years [6].

Despite these challenges, research shows that switching to English-only education improved academic success and enthusiasm to study English among Central Asian college students. However, concerns persisted about a lack of resources and trained teachers for English training in certain areas. Research shows that language policy and school reform are important in supporting academic excellence and preparing students for a globalized environment. It also underlines the need of increased language education research and investment to guarantee that all kids have access to high-quality language teaching and successful opportunities [7].

Based on this study results, they propose that English language instruction be emphasized in Central Asia in order to better prepare children for a globalized world and improve academic achievements. This involves investing in competent English teachers, resources, and technology, as well as encouraging language exchange programs and study abroad possibilities. Furthermore, they advise that language policy efforts in Central Asia should take into account the particular linguistic and cultural contexts of each nation and strive for a balanced approach to multilingual education that encourages the development of all languages spoken in the area. [7].

2.2 Engagement

Early attempts to operationalize the concept of "student engagement" were associated with measuring the amount of time that a student spends on assignments and learning in general. The emphasis on time indicators was largely due to the

belief that the time used can be used to judge learning outcomes [8] [9].

The most famous definition in this sense was proposed by A. Astin: "Student involvement is a combination of physical and mental energy expended to acquire academic experience" [10]. According to the scientist, the concept of "involvement" is associated with the Freudian concept of "cathexis", which means investing energy in objects that are outside the subject. In the case of student involvement, such an object is learning. The concepts of V. Tinto and S. Mann can also be attributed to sociological approaches to the study of student involvement. In accordance with the first, the student adapts to university life through academic and social integration [11]. Academic integration is expressed in observance of explicit norms, such as the need to pass exams, as well as in adherence to the normative academic values of the university. Social integration is expressed through involvement in relationships with students and teachers [12].

Researchers are increasingly inclined to conclude that the quality and results of student learning depend on what activities and how the student was involved in the university, how interested he was in learning, how he treated learning and how much time he devoted to various types of university activities in the learning process [13]. All these indicators reflect such a general concept as "student involvement": the more time a student devotes to university activities and the more he is immersed in this activity, the higher his involvement.

The study of student engagement in universities and colleges has become popular in recent years and is often carried out in conjunction with research on student expulsion factors. In addition, student expulsion and engagement are viewed by many theorists working in the field of higher education studies as interrelated phenomena. The article by I. Gruzdev analyzes the theories and approaches that describe the phenomenon of student expulsions [14].

The expulsion of a student is the result of his education, as well as the academic performance and successful completion of the educational process. In a number of theories, it is the result of learning that is an indicator of the development of students, and, consequently, the effectiveness of educational policy programs of universities [15] [16] [17] [18].

According to Astin [10], this model needs to include the third element - student involvement - and pay attention not to the result of learning as evidence of a certain level of development of the student, but to the process in which this development occurs. With this approach, all activities and reforms carried out within the framework of the educational policy of the university will be considered effective if they increase the level of student involvement, and ineffective otherwise. Thus, the very idea of student engagement postulates the following principle: "Students gain knowledge and skills from what they do within the university" [19]. Pace, in "Measuring the Quality of the College Student Experience," also calls for evaluation not only of educational outcomes (the product), but also of the learning process itself, i.e. process that creates a product [20]. Thus, by paying attention to student engagement and stimulating its increase, we can reduce the level of student dropouts and increase the overall education of students.

Student engagement theory originates from research on student dropouts. On the basis of longitudinal empirical research, it was revealed that these two concepts are closely interrelated. For example, the relevance of studying how a university affects student learning, development, and student engagement is often explained by the high level of student expulsions from this university, which persists for a significant period of time [21] [22].

In Tinto's model of student deductions, a college is seen as a combination of two systems: academic and social, into which students are integrated. Engagement, in essence, is this integration. Expulsion, according to Tinto, occurs when the student is poorly integrated into these two systems, i.e. with an extremely low degree of involvement in the social and academic life of the university [23].

2.2.1 Definition of the concept of "student engagement"

Several attempts have been made to define the concept of student engagement. The most popular concept of student engagement was developed by Astin [10] and is based on a psychological understanding of the phenomenon (the author was a clinical psychologist before working in education). According to Astin, the idea of student involvement is consonant with Freud's understanding of such a thing

as "cathexis", which describes the investment of psychological energy in objects that are outside the subject. His definition of this concept is as follows: "Student involvement is the totality of physical and mental energy spent on acquiring academic experience" [10].

Readings also used the Freudian concept of "cathexis" in relation to the attitude of students towards university practices and to describe the phenomenon of student involvement [24]. In his work The University in Ruins, he speaks of the passivity of students associated with the fact that the university has become a bureaucratic organization: "In the long run, student passivity is the exception rather than the rule, so we must ask what the passivity of students today means. In 1968, students decathected by rebellion; today they don't catectect at all" [24]. Thus, activity in his understanding is the investment of psychological energy in learning.

Pace uses the term "quality of effort" instead of "student engagement". In his understanding, it is the efforts expended by the student on learning, and their temporal expression, that can be considered as the main criterion for assessing the quality of the product itself, namely, the knowledge and experience accumulated by students [20].

According to Newman, student engagement is about more than simply completing assignments and earning high grades and social recognition from faculty and peers. Completing assignments is not always associated with a high degree of student involvement. On the contrary, many studies have found that students invest a large amount of psychological energy in following procedures and performing routine rituals without understanding the material and significant development of skills [25] [26] [27] [28].

Student engagement is often defined as a student's willingness to participate in everyday university activities such as attending classes, preparing and submitting papers, and "listening" to the teacher during class [29]. However, student involvement is also used in wider meanings, including extracurricular activity of students [30] and participation in the formation of the design of the educational process [31]. It can be noted that all these definitions are derived from the initial under-

standing of student involvement as a combination of physical and psychological energy spent on acquiring academic experience.

The article [32] divide all the theories of involvement into three types: traditional theories, liberal approaches to the theory of student involvement (or student-oriented) and the critical-democratic concept of involvement [32]. The third approach to the study of student engagement arises as a response to the first two, which, according to the authors, are not able to fully describe the phenomenon due to their limitations.

A typical representative of the traditional approach to the conceptualization of student involvement is Newman [33]. In his work "Student Engagement and Achievement in the American High School" [33], student engagement is understood, as already mentioned above, to be a psychological investment and effort in learning, and the effort should go beyond the simple completion of tasks and contribute to obtaining high grades and social approval.

A criticism of the traditional understanding of engagement is that, according to [32], this concept focuses more on what engagement implies rather than what it is, and this equates engagement with student motivation to fulfill prescribed goals. With this approach, students are involved if they comply with the social norm, which limits the freedom and understanding of the learning process itself at the university. The representation of involvement in such a context is too limited and linear, speaking, it is focused on behavioral manifestations and their broad psychological interpretation, which does not reflect the nature of involvement [32].

McMahon and Portelli also talk about the importance of teacher involvement in the learning process. Engagement is seen as a method of empowering both students and faculty. In this model, both subjects of relations are responsible for student involvement [32]. Such an interpretation of involvement removes the limitations and linearity of the concept and refers us to the goals of involvement.

The ability to communicate in English has grown to be a crucial factor in evaluating students' interest and engagement in a range of subjects, including politics, business, economics, society, and education [34]. To aid students in understanding their subject matter, English language lessons have been included

into the curriculum of departments that do not teach English. Although there isn't a set standard for English proficiency in Kazakhstani universities, it has turned into a need for students looking to pursue further education, such a master's degree, or enroll in specific higher education institutions. English for Academic Purposes or English for Special Purposes must be taught in a classroom setting at a level where students can understand the material.

Students' proficiency in the English language may have a big impact on how well they do in school, with better language users likely to face fewer obstacles. In order to help students succeed, teachers must modify their standards and assessment procedures [35]. The fact that non-native English speakers may find it difficult to reach a certain degree of computer programming competency due to their limited language skills emphasizes the significance of English proficiency in forecasting academic development [36].

A strong command of English is essential for information systems and computer science students to effectively utilize the necessary programming language syntax and terminology to provide instructions to computers, as well as for acquiring knowledge and enhancing cognitive abilities. Students with inadequate English proficiency may encounter difficulties in comprehending course material and completing assignments [37]. Furthermore, simplifying language and English materials to facilitate students' comprehension of their field of study may decrease their ability to work within a particular subject [37].

Their study [38] examined the errors commonly made by beginner programmers during programming laboratory exercises, which encompassed a range of issues such as the use of incorrect or mismatched characters, the omission or misuse of certain names, as well as the inclusion of excessive or unnecessary characters. These errors can serve as reliable predictors for inexperienced programmers, and most students with inadequate English proficiency may have difficulty identifying programming errors that cause their projects or code to fail.

In terms of second language learning, language proficiency is linked to the motivation of students, but this relation- ship may depend on the particular components of language competency being assessed. According to several research

articles, when language proficiency examinations assess a student's oral communication abilities, pupils are more motivated to acquire a second language. Exams that test other language abilities, such as reading or writing, on the other hand, may lower motivation [39].

It is critical for instructors to emphasize reading and develop strategies to raise student motivation in this area in order to improve students' grasp of the information they are learning. One possible technique for increasing motivation is to use English as the medium of teaching in programming courses, since this is the major language used by programmers and may assist students in becoming more adept in programming vocabulary, syntax, and symbols [40]. As Solomon suggests with regard to computer programming languages, exposing pupils to foreign languages at an early age may also aid in language acquisition. There are different linguistic components in both human and computer languages, such as subjects, verbs, pronouns, modifiers, and adjectives, and students should be able to build increasingly complicated sentences by combining more important terms.

2.3 Google Forms as a tool to collect data

Google Forms is an online application that lets users construct various forms, including quizzes, questionnaires, and surveys. It is a component of Google Workspace (formerly G Suite), a collection of tools for productivity and collaboration.

A form that has been developed may then be integrated on a website or shared with others using a link that has been generated. The form is accessible on computers and mobile devices, and respondents may submit their comments online. Real-time replies may be gathered and seen by the form designer, and the data can be exported to a spreadsheet for further analysis or interaction with other programs.

A popular option for surveys, event registration, feedback forms, academic research, and many more data collecting purposes, Google Forms offers a user-friendly interface, straightforward design tools, and strong collaboration capabilities [41].

As a tool for creating forms and gathering data, Google Forms has a number of advantages:

Usefulness: Google Forms' drag-and-drop capability and user-friendly interface make it simple for users to build and alter forms without the need for coding or other specialized knowledge. Quick and effective form generation is possible thanks to the user-friendly design tools.

A broad range of customization options are accessible to users, including the ability to choose from a variety of question kinds, include photos and videos, change themes and colors, and modify form settings. This enables users to produce forms that are expert-looking and consistent with their branding or particular needs

Google Forms automatically gathers and arranges the data in a Google Sheets spreadsheet when respondents submit their replies. By doing so, the necessity for manual data input is removed, and it also makes sure that the replies are visible and searchable. Users may see replies in real-time, allowing them to keep track of and examine data as it is being gathered. For fast insights, Google Forms offers visualizations and summary statistics. Users may also design their own charts and graphs to further explore the data.

Data Validation and Branching: With the help of Google Forms' data validation rules, users may make sure that respondents provide true and correct answers. Users may also design branching logic, which bases new questions on prior answers, making forms more dynamic and specific to each reply.

Mobile-Friendly: Respondents may easily access and complete forms on their smartphones or tablets since Google Forms is designed for mobile devices. This raises response rates and gives users the freedom to get information from different sources. Free: Anyone with a Google account may use Google Forms without paying a cent. As a result, it is an affordable choice for private citizens, companies, academic institutions, and nonprofit organizations.

Overall, Google Forms is a popular option for a variety of applications because it provides a simple-to-use, adaptable, and strong platform for generating, sharing,

and analyzing forms and surveys.

Author [42] did a study that showed that Google Forms was an unusual formative assessment tool that has worked well to use students' comments to improve course teaching. The result of the exam gives real-time feedback, which lets the professors and teachers deal with problems right away. The study's results showed that the students' grades went up a lot because the teachers changed the way they taught based on what the students told them.

Also, a study by [43] showed that Google Form is a good way to measure. But the study stressed that Google forms may not be useful if the instructions are not well thought out. Also, the study's results showed an interesting fact about how important it is to protect the privacy of the students when sharing worksheet results. To keep the students' self-esteem up, it is important not to publish their scores without their permission.

The other study, which was done by Narayanaswamy Vasantha Raju and Harinarayana N.S. [41] and called "Online survey tools: a case study of Google Form," found that web-based surveys have become important because they cost less and can reach more people from different groups. Indonesia has a steady rise in the number of people who use the internet and smartphones, so using Google Form as an EFL testing tool could be one way to test the students. Google forms can also be used to evaluate, but Scheef and Johnson (2017) say that they shouldn't be used instead of standard methods like interviews and notes. Using it also makes sure that students with disabilities get the help and skills they need to meet their goals.

Author [44] did another study in 2018 that showed the different ways that students' worksheets can be made in Google Forms. The study was very clear about how to make the online worksheets. They said that the Google Forms exercise was helpful because it made learning fun and saved time during the grading process. The study done by Agung et al. (2019) also shows that Google Forms exercises set up tasks for students that are efficient, effective, and interesting.

Chapter 3

Methodology

3.1 Data Collection

3.1.1 Data collection by Google Form

At first, we decided to focus on 1st and 2nd year students of our university as the main audience. This choice was based on my close interaction with them over the past two years as curator and teacher of a course on fundamental programming.

We then developed an action plan for conducting the study. The first step was to do a poll of first- and second-year students to find out how well they spoke English and how interested they were in the computer training. The poll asked about things like how they felt in a computer class because of a language problem, and if there was a possible link between how well they spoke English and how well they did in the class.

We also wanted to know if the language barrier makes it hard for students to understand the basics of programming and if they think that being taught in English affects how well they do in a programming school.

Based on the findings of this research, we want to examine the data to see if there are any correlations between a student's proficiency in English and their performance at a computer school. This will enable us to determine how the language barrier may make learning to code challenging and what can be done to

support children along the way.

In general, we chose first- and second-year students as the primary audience for our research in the outset. Then, depending on how well the students spoke English, we created a poll asking about how well the students performed in the computer course.

We chose Google Forms as the platform for our student survey. This decision was taken since prior research by other students shown Google Forms to be a practical and user-friendly polling platform. Many of the features and tools required to create and administer a poll are available in Google Forms. In a method that was simple to assess, we were able to create questions, add potential responses, make certain questions compulsory, and gather replies.

We were able to interview students and gather important data for our research with the use of Google Forms. The following questions were included in our survey in order to determine how the language barrier influenced students' capacity to learn computers and their level of engagement with the subject:

Students were given the opportunity to indicate their agreement or disagreement with the use of their responses in the research by way of this consent question.

1. Question about the influence of the language of instruction: We asked the students if they felt that the language of instruction (English) in their programming course had a significant impact on their academic performance. This question allows you to assess their perception of the impact of the language aspect on learning.

2. Question about understanding the principles of programming: We were interested in how difficult it is for students to understand the principles of programming due to the language barrier. This question helps us understand how the existing language barrier can create learning difficulties.

3. Question about the relationship between English level and grades: We asked students if they noticed any relationship between their level of English and their grades in the programming course. This question helps to identify a

possible correlation between language skills and academic achievement.

4. Question about Feeling Excluded: We asked students if they felt excluded or excluded from the programming course due to the language barrier. This helps us to understand how language problems can affect the comfort and involvement of students in the educational process.

5. What factors contribute to poor academic achievement and student inactivity in programming classes?

6. Question about the degree of involvement in the course: We were interested in how much students were involved in the course on programming. This question helps us assess the degree of their active participation and interest in the subject.

We selected the questions for our survey based on recommendations from OECD studies that examine in detail survey methodology and data quality assessments. Using advanced research methods, we have sought to ensure the validity and reliability of the results obtained. The OECD conducts research and develops recommendations on the use of questionnaires and the assessment of data quality, based on the experience of its members and best research methods. The group is looking into many different parts of poll research, such as its methods, how questions are made, how problem areas are chosen, how data is processed, etc.

Getting high-quality data from surveys that can be utilized for research and policy making is one of the key objectives of the OECD in this area. In order to ensure that the data gathered is accurate and trustworthy, the organization is committed to developing best practices and standards in the field of poll research. The OECD is also investigating issues related to data collection, such as ensuring that the sample is representative, encouraging participation, reducing bias and response errors, and ensuring that the sample is representative. The team is searching for fresh approaches to improve the quality of poll data and make it simpler to utilize for analysis and decision-making.

The OECD is also investigating issues related to the ethics of poll research, such as how to safeguard respondents' private information, maintain information

secrecy, and adhere to ethical standards for scientific research. The OECD is dedicated to creating and advancing best practices for survey research in general. These may be used to enhance data gathering and analysis procedures and provide more precise and trustworthy findings in studies on economics, education, social concerns, and other relevant subjects.

The first thing we did when we decided to survey the students was to plan. We have chosen what we want to learn from the poll and have created some questions to guide us in that direction. It was critical for us to discover what the students believed, enjoyed, were, and other aspects of their educational experience.

After creating the poll, we sent it to around 1,500 first and second year students. Email, a learning management system, and social media were used to communicate with students as often as feasible. In order for students to complete the poll in their own time, we attempted to make it simple for them to access and utilize.

We wanted as many individuals as possible to respond to the poll when it was distributed. We received roughly 400 responses from children, proving that what we did was effective.

The poll's ability for students to participate in it anonymously was a crucial component. When they responded to our inquiries, we wanted them to feel secure and comfortable. Since the poll is private and we won't be using the students' names or other personal information when we analyze the results, we have made it obvious that it is private.

We were pleased to learn that, out of the 400 responses we received, 370 students agreed to have their responses utilized privately for academic purposes. This implied that we might utilize their data without identifying ourselves to them. This was a crucial step in ensuring that the information provided by the students was utilized appropriately.

3.1.2 Google sheets

A free computer program called Google Sheets enables you to create and edit spreadsheets online. Google is the maker of it. It enables you to do several types of arithmetic and data analysis in addition to creating, editing, and styling tables.

There are several features in Google Sheets that enable you to arrange data, create graphs and charts, do calculations using formulae and functions, and collaborate with others in real-time. It integrates with other Google services, such as Google Docs, to make using and sharing across applications simpler.

Both a web app for use in a web browser and a mobile app for Android and iOS devices are offered by Google Sheets. It is often used for both private and professional reasons. It is a practical and adaptable alternative for a cloud-based spreadsheet.

You have a wide range of spreadsheet options with Google Sheets. Here are a few illustrations:

Creating and editing tables: You may create a new table from scratch or import data from a file. Rows, columns, and cells may all be added to, removed from, or altered.

Formatting: Google Sheets offers a variety of options for customizing the appearance of your spreadsheet. Among other things, you may employ styles, alter fonts, colors, and layout.

Google Sheets offers a ton of formulae and functions that you can use to do computations and take various angles on data. Formulas may be used to conduct arithmetic, add numbers, calculate averages, sort data, and more.

You may create graphs and charts using the information in the table. You can create a variety of charts with Google Sheets, including bar charts, pie charts, line charts, and more. You may alter the appearance of charts, make comments, and do other actions.

With Google Sheets, you can collaborate in real time and exchange information. You may share the spreadsheet by links or email, ask colleagues or friends to

collaborate with you on it, and see changes and add comments as you go.

Automation and coding: You may automate tasks, create custom functions, and link Google Sheets to other Google services like Google Docs and Google Calendar using JavaScript code.

These are just a few of the things Google Sheets may be used for. It contains even more capabilities that improve the effectiveness of dealing with data and tables on the web.

I was able to evaluate student data as a university instructor of this topic by using the university system's information, such as their final scores for a course in fundamental programming and their English proficiency levels. I was able to get information in the form of tables thanks to this access.

These English grades and levels were obtained strictly in accordance with the university's privacy laws and regulations. The collection and handling of all student data, including personal data and grades, was done with regard for the students' security and privacy.

After receiving the information in the form of charts, I performed an analysis to search for patterns and trends in the students' final grades and English proficiency levels in the introductory programming course. I concentrated on the important elements of the study to determine how the English proficiency of students impacts their performance in the programming area.

It's important to know that all of the data study was done in a way that kept everything secret. I followed ethical rules and made sure that students' personal information was safe, as required by law and university policy. All of the analysis's results and findings were given and used only for scientific and educational reasons, to improve teaching and help students do well in school.

This experimental method that is based on data has given me important insights and results that I can use to make learning strategies, change the course material, and measure how well I teach. At the same time, the privacy of student information was fully protected, and the rules and principles of scholarly ethics were followed.

I did my study with secondary info. When I use secondary data for analysis, I strictly follow the rules of confidentiality and ethics, as well as all laws and policies that protect student privacy and protect data. I only use the secondary data I get for scientific and educational reasons, so I can grow and strengthen my study.

When I use external facts, I pay attention to how good, reliable, and useful they are. Before putting these data into the process of analysis, I check and study them to make sure they are accurate and useful for my research.

It's important to remember that when I do secondary data analysis, I don't give out personal information about kids or other private information. All processing and analysis of data is done on a bulk level so that general trends and patterns can be found and generalized results can be found that can be used for scientific and teaching reasons.

The use of secondary data is an important tool for expanding my research and enriching the pedagogical process. This allows me to gain a better understanding of the factors that influence student success and provide more effective teaching and student support in the university environment.

3.2 Data Analysis

3.2.1 Analyzing data from a Google Forms survey

The Figure 3.1 reflects the results of a survey conducted among the participants of the programming course in order to measure the level of their involvement in the learning process. Answers to the question "To what extent were you involved in the programming course?" were presented as a percentage.

Analysis of the data shows that among course participants, 14.6% reported their involvement at the level of 20%. This suggests that a small proportion of participants experienced a limited degree of involvement in the learning process.

The other 14% of participants responded that they were 100% fully involved in the course. This indicates that a certain group of students were very active and deeply involved in the study of programming, completely immersing themselves

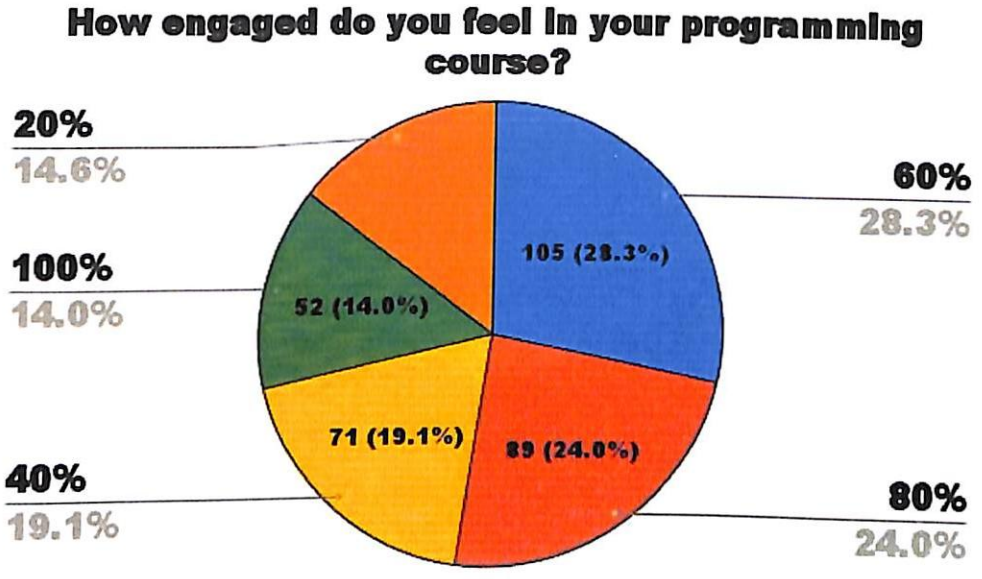


Figure 3.1: How engaged do you feel in your programming course

in the material and learning tasks.

The next part of 19.1% reflects the participants who reported their engagement at 40%. This suggests that some of the students showed an average degree of interest and activity during the course.

Further, 24% of the participants answered that they were involved in the course at the level of 80%. This indicator indicates the presence of a significant number of students who showed a high degree of involvement and interest in learning programming.

The remaining 28.3% of the course participants reported their involvement at the level of 60%. This indicator indicates the average level of involvement, where students showed an average level of interest and activity in the learning process.

Thus, the results of the survey allow us to conclude that the involvement of students in a programming course varies from low (20%) to high (100%). The overall picture shows that the majority of participants (more than 50% combined) experienced a significant degree of involvement, although the level of this involvement may differ among them.

This Figure 3.2 represents the results of a survey conducted among participants

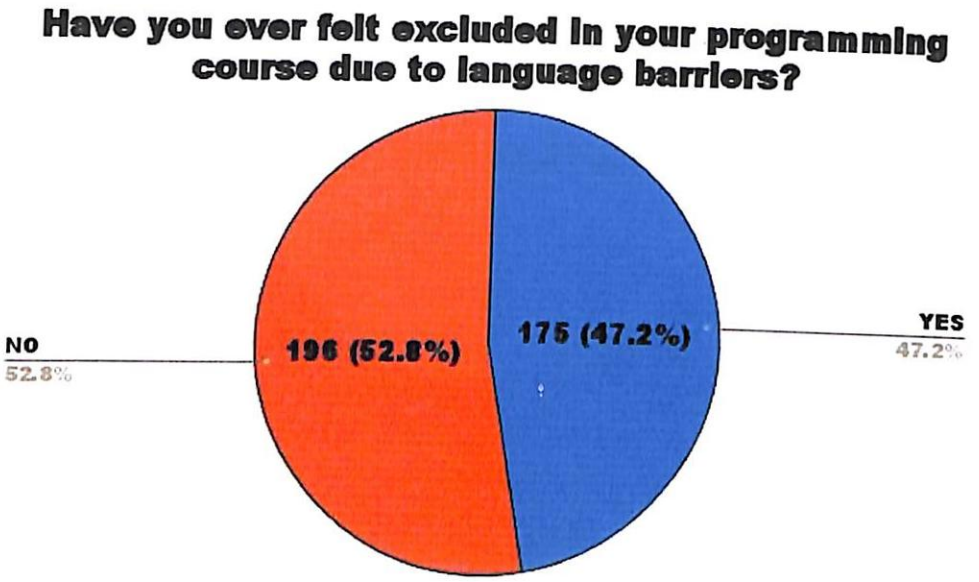


Figure 3.2: Have you ever felt excluded in your course due to language

in a programming course to explore their feelings of exclusion or detachment due to the language barrier. When asked, "Have you ever felt left out of or been left out of a programming course because of a language barrier?" there were two possible answers: "yes" or "no."

Analysis of the data shows that 47.2% of participants who took the poll said that they felt left out or left out of things because of the language problem. This finding shows that a large number of students had language problems that could have made it harder for them to do well in the computer study. They might have trouble understanding what they are learning and getting along with teachers and coworkers. This could make them feel alone and disconnected.

The other 52.8% of people who took the poll answered negatively, saying that they did not feel left out or that they were left out because of the language problem. This means that more than half of the students didn't have obvious problems because of the language barrier. They probably felt relaxed and like they were a part of the learning process.

So, the poll results show that a large number of students (47.2%) had trouble with the language and felt left out of the computer class or were kicked out of the class. These data can help course managers and teachers figure out what to do to

help these students and make the classroom a better place for everyone to learn.

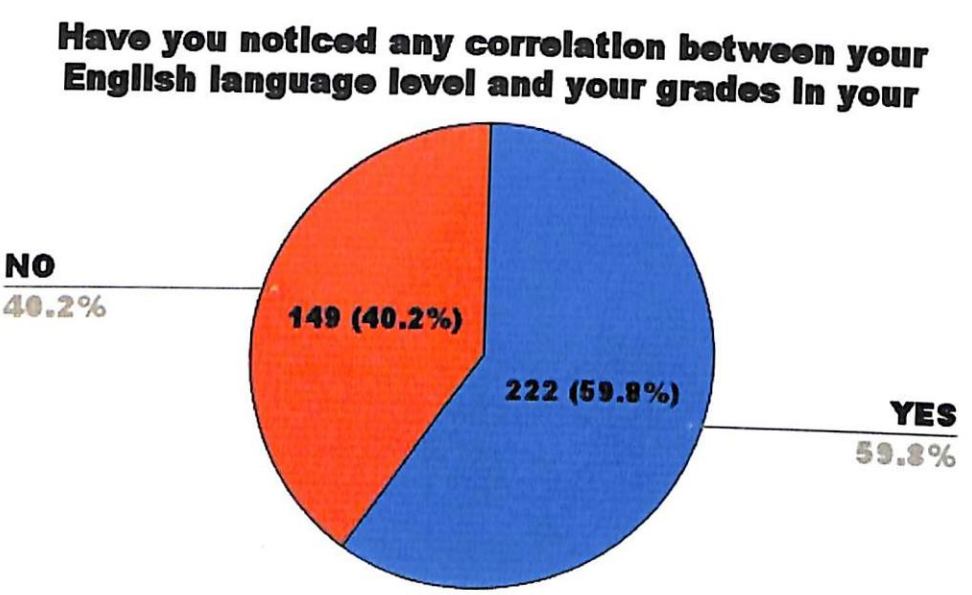


Figure 3.3: Have you noticed correlation between language level and grades

Figure 3.3 shows that 59.8% of the people who answered the poll said that they thought there was a link between their level of English and how well they did in the computer course. This means that a lot of students know how important it is to know English if they want to be successful in their computer studies. They saw that a higher level of English helped them understand the lessons better, communicate better with teachers and classmates, and get better grades as a result.

The other 40.2% of people who took the poll answered "no" and said they didn't see any link between their level of English and how well they did in the computer course. This means that these kids may be doing well in school for reasons other than English, and that English is not the main reason for their grades.

So, the poll data show that most of the people who took part (59.8%) saw a link between how well they spoke English and how well they did in the computer course. This may show how important it is to improve your speaking skills if you want to learn the subject better and do well in the study. These results can help teachers and course managers put more attention on language support and give users more resources and tools to help them deal with language problems and

learn more in programming.

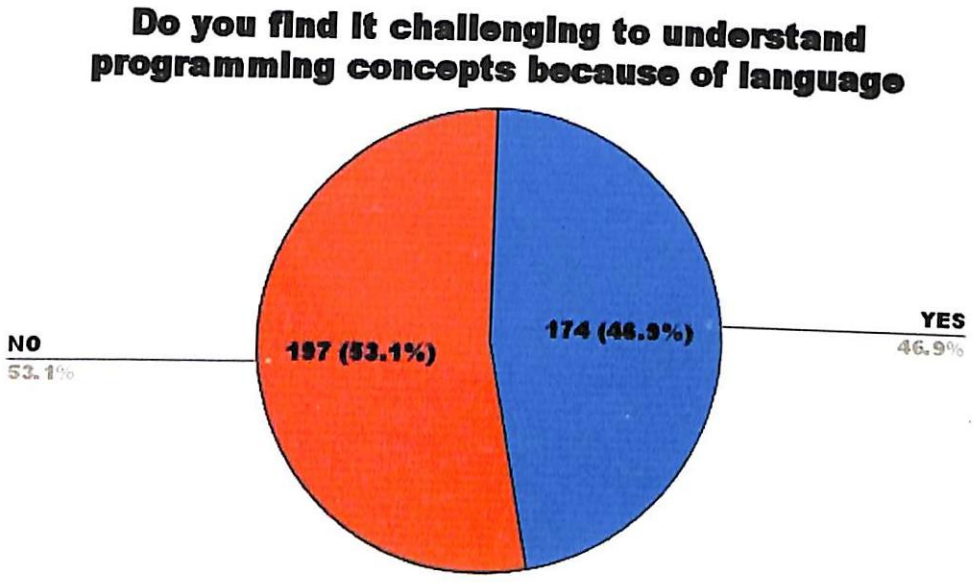


Figure 3.4: Challenges to understand due to language level

From the study of the data in Figure 3.4, it is clear that 46.9% of the people who took the poll said it is hard for them to understand the basics of computing because they don't know enough English. This means that the language barrier makes it hard for almost half of the students to understand the course material and computer ideas. If someone doesn't speak a lot of languages, it can be hard for them to understand and remember key ideas and terms. This can make it harder for them to learn how to program and make them less likely to succeed at it.

The other 53.1% of the people who took the poll answered "no" and said that the language barrier does not make it hard for them to understand the basics of programming. This means that more than half of the students don't think that their poor English makes it hard for them to understand code. They might use interpreters or get help from teachers and classmates. They might also find other ways and tools to learn the subject.

Thus, the results of the survey indicate that a significant part of the participants (46.9%) has difficulty in understanding the principles of programming due to the language barrier. This highlights the importance of supporting students with

limited language skills, providing additional resources and assistance to facilitate their understanding and success in programming material.

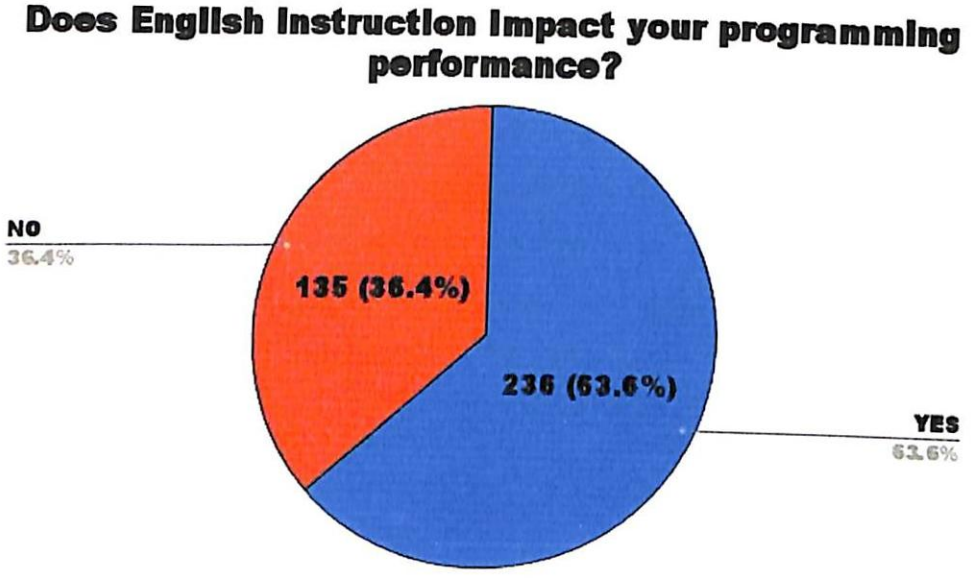


Figure 3.5: Does English instruction impact on your programming performance

By analysing the data from Figure 3.5 shows that 63.6% of the survey participants answered in the affirmative and stated that the lessons in English had a significant impact on their final grades. This result indicates that more than half of the students believe that the language of instruction is an important factor influencing their success in their programming studies. They probably believe that understanding the learning material, communicating with teachers, and completing assignments in English play an important role in their overall academic performance.

The remaining 36.4% of survey participants responded negatively and stated that they do not believe that the language of instruction has a significant impact on their final grades. This indicates that for this group of students, the language aspect is not the main factor determining their success in programming studies. They may be overcoming linguistic barriers or they may have come to the conclusion that other factors, such as skill level and effort, are more crucial for academic achievement.

The majority of those who responded to the survey (63.6%) believe that the

teaching language (English) has a significant impact on students' performance in the computer course. This demonstrates how crucial it is to focus on language assistance and develop effective learning strategies so that children can cope with language issues and do better in school.

The study's findings may be used to get a general understanding of how the language barrier influences the process of teaching programming. According to the poll's findings, 46.9% of the respondents had difficulty understanding the fundamentals of computers since they don't know a lot about the English language. This demonstrates how crucial it is to consider linguistic assistance and develop effective strategies for teaching children to cope with these issues.

The language of instruction (English) is also believed by more than half of those who responded to the survey (63.6%) to have a significant impact on students' performance in computer classes. This demonstrates how crucial it is to develop strategies and resources to assist students with poor language proficiency and provide them with additional resources to help them comprehend the topic and study it thoroughly.

Also noteworthy is the fact that 47.2% of those who responded to the survey said that the language barrier caused them to feel unwelcome at the computer school. This demonstrates how crucial it is to create a learning environment where students with various language proficiency levels may feel secure and engaged.

Based on the information given, we can say that the language barrier has a big effect on how students learn and how well they do in the field of programming. For these problems to be solved, steps need to be taken to improve language support and create an open learning environment. This helps students become more motivated and succeed in learning programming as a whole.

3.2.2 Analysis of data by Google Sheets

The present investigation utilizes a correlational research design to explore the extent of the association between students' level of English proficiency and their proficiency in computer programming. To assess students' English proficiency, we employ the results of an assessment administered by the CEC (Continuing

Education Center) department at Suleyman Demirel University. Additionally, we utilize the evaluation of students' performance in the Fundamentals of Programming course as a measure of their computer programming competence.

This course is offered to undergraduate students pursuing degrees in Information Systems and Computer Science. The research participants consisted of first and second-year students enrolled at Suleyman Demirel University, totaling 1158 individuals. The participants were categorized according to their performance on the English proficiency exam, and subsequently, their scores in the programming course were categorized utilizing the grading system established by the university, which includes grades of F, D, C, B, and A. The resultant outcomes of both the English proficiency exam and programming course performance were compared for analysis.

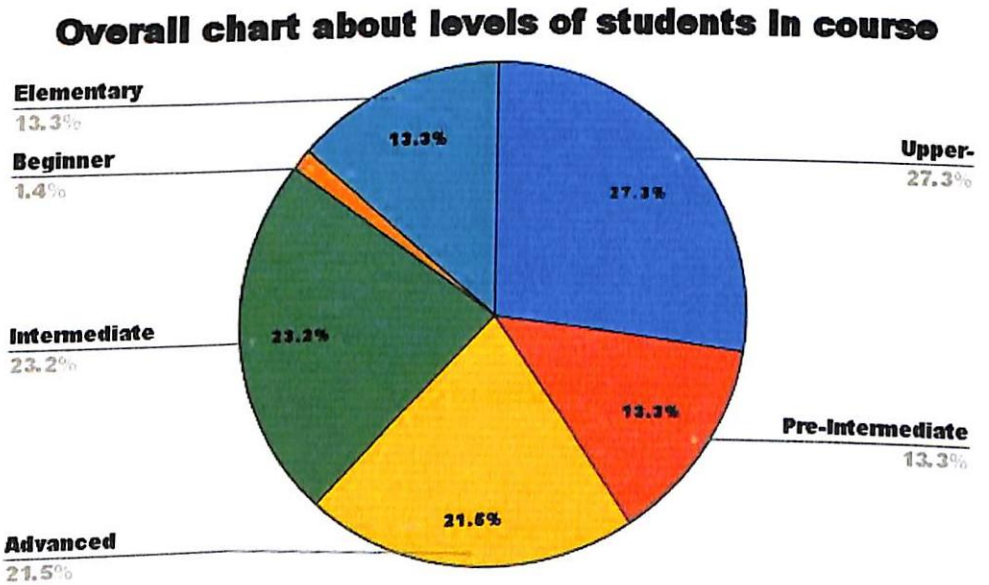


Figure 3.6: Students level

The Figure 3.6 represents the distribution of English language proficiency levels among students who have registered for the course "Fundamentals of Programming." The data illustrates the percentages of students falling into each proficiency category.

The chart reveals that among the total number of students, the smallest proportion, approximately 1.4%, are classified as "Beginner" level in terms of their

English language proficiency. This indicates that only a small fraction of the students have very limited or basic knowledge of English.

Moving on, the graph shows that more pupils are enrolled in the "Elementary" level, which accounts for around 13.3% of all students. This indicates that a significant portion of the pupils has fundamental English speaking abilities, however they may still need further practice to achieve higher levels of competency.

Similarly, 13.3% of students are considered to be at the "Pre-intermediate" level. This indicates that a majority of kids have advanced beyond the fundamental level and can comprehend and communicate in English to some extent.

The table also reveals that the "Intermediate" level has the highest percentage of pupils, at roughly 23.2%. This indicates that many of the students speak English at a mediocre level, which allows them to easily grasp the majority of schoolwork and participate in more complex conversations.

About 27.3% of the students fall into the "Upper-Intermediate" category as skill levels rise. This demonstrates that many pupils are proficient in English and are able to communicate and comprehend challenging academic subjects.

Last but not least, the graph reveals that around 21.5 percent of the students are at the "Advanced" level. This indicates that many children have developed their English language abilities, which translates to greater English understanding, speaking, and writing.

In terms of research, it's clear that the students who signed up for the "Fundamentals of Programming" course have different levels of English language skills. This means that teachers should think about using ways to teach that take into account the different levels of English ability in the classroom.

By giving them tailored help and resources, like extra materials or tasks that focus on language, teachers can help students with lower levels of English language ability improve their skills and understand the course topic better. Also, giving more experienced students difficult jobs and school materials can keep them interested and help them improve their language skills even more.

Understanding the distribution of English language proficiency levels among

students can inform instructional approaches, allowing educators to create an inclusive learning environment that addresses the needs of diverse language learners. By recognizing these variations in proficiency, instructors can foster effective communication, promote active participation, and support student success throughout the course.

Subsequently, the forthcoming stage of the research endeavors to undertake a thorough evaluation of each level of English proficiency in relation to student performance. The gathered data shall be meticulously analyzed with the intention of advancing further research, as well as providing students with a framework for advice prior to undertaking a course in fundamental programming. Presently, the research team shall proffer a series of diagrams, each corresponding to a distinct level of English proficiency. These visual aids are intended to effectively convey that students possessing a lower level of English proficiency have a greater likelihood of experiencing academic setbacks in comparison to their peers with higher levels of proficiency.

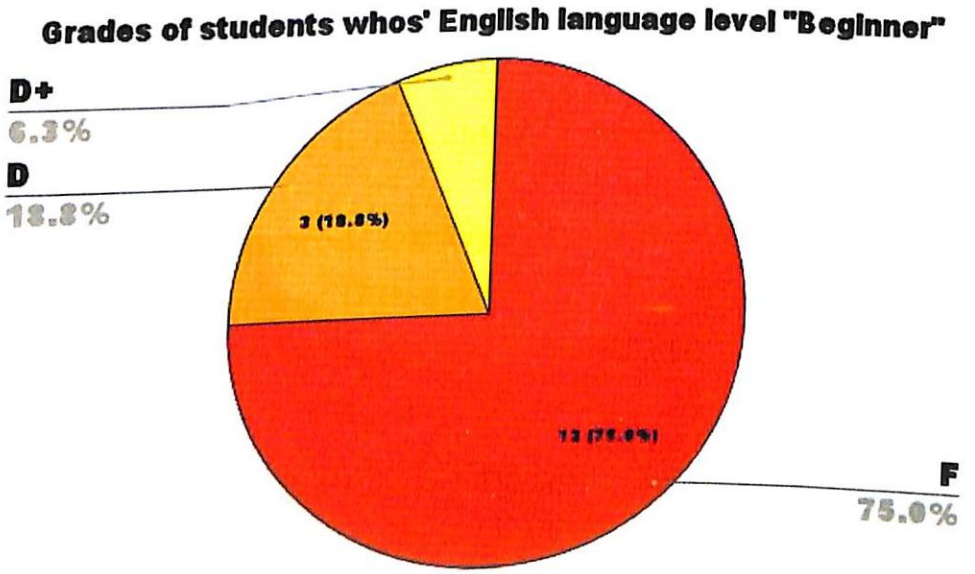


Figure 3.7: Results of Beginner level

As delineated in Figure 3.7 , a substantial proportion (75%) of students exhibiting low levels of English proficiency were unsuccessful in their attempts to complete the course. Moreover, a considerable number of students in this group received grades of only "D".

Figure 3.8 delineates the academic performance of students at the "Elementary" level, which reveals a somewhat ameliorated state of affairs compared to the preceding level. Nonetheless, approximately 20% of students fail to meet the requisite academic standards, thereby yielding unsatisfactory results. If we take 70 as a passing student, we can see that almost half of the students of this level failed the course

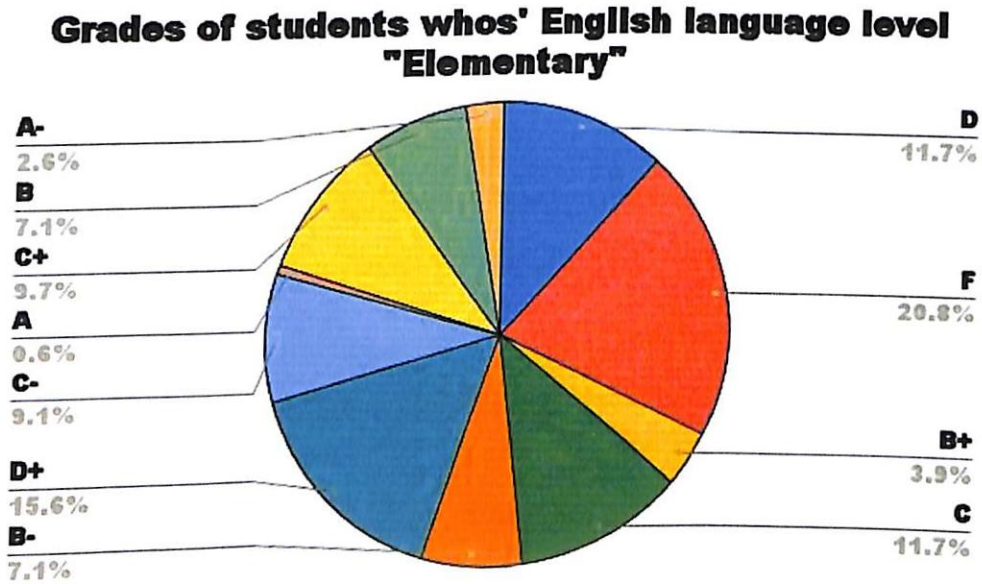


Figure 3.8: Results of Elementary level

The next level of instruction, namely "Pre-Intermediate", warrants closer examination, as the outcomes of this stage are equally crucial. Regrettably, a considerable proportion of students continue to under perform, with as many as 50% earning grades lower than a "C".

The relationship between language proficiency and academic achievement has been an area of interest in educational research for many years. In particular, the relationship between English language proficiency and performance in programming courses has been the subject of much investigation. The present study focuses on the analysis of three distinct levels of language proficiency, namely "Intermediate", "Upper- Intermediate", and "Advanced", and their impact on programming success.

Upon careful examination of the available charts, it is evident that these levels

exhibit superior performance com- pared to lower proficiency levels. The Intermediate level, with a significant percentage of students failing the course, stands out as a noticeable departure from the performance shown in the previous two levels. This might mean that a certain level of language competence is required to pass a programming course, after which subsequent increases in language ability could only have a little effect on programming success.

On the other hand, pupils in the "Upper-Intermediate" and "Advanced" levels do well, with more than half receiving good marks. This backs with other studies that discovered a link between better English language competency and performance in programming classes. It's probable that students with higher language skills will have an easier time understanding programming ideas and instructions, which will help them do their programming assignments more successfully.

The importance of recognizing that students with a high degree of English proficiency, both in terms of knowledge and competence, are better able to overcome difficulties while creating code is significant in the context of computer programming. English language skills is a key component in enhancing non-native English speakers' capacity to use programming languages. When students are acquainted with the necessary terms, syntax, and symbols as well as being able to spot mistakes in their code, they are better able to understand programming languages. The results of this research showed that the ability to write high-quality, error-free code for different kinds of systems is significantly influenced by one's degree of English proficiency. Consequently, it is recommended that a minimum level of English proficiency be established as a requirement for admission to information systems and computer science programs. English should also be recognized as a language that is integral to computer programming classes and should be taught accordingly.

3.2.3 Analysis of engagement in weekly contest in programming course

Figure 3.9 shows that the top left part of the curve is thicker, which means that most students do well in the first few weeks of the term and haven't dropped out

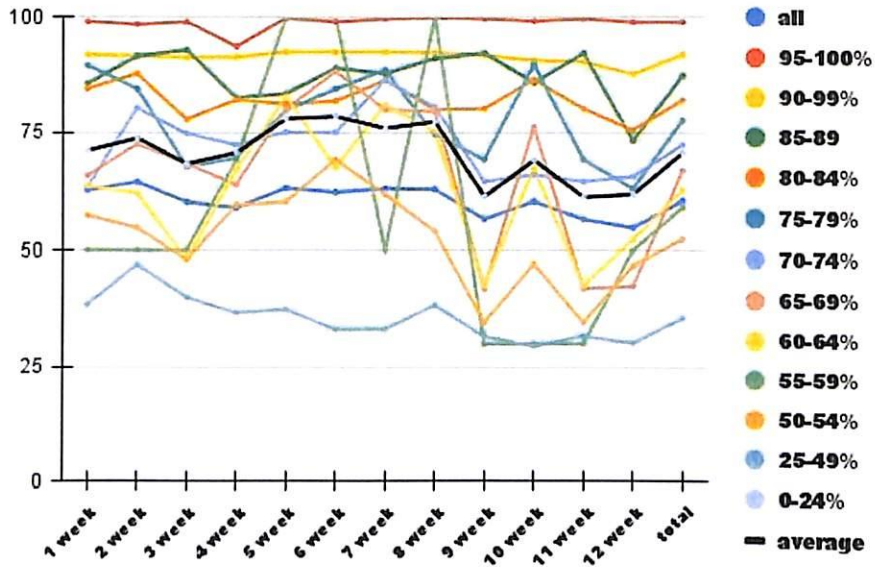


Figure 3.9: How engaged feel students on course

of the course.

But it's important to note that, despite this starting trend, some students missed some events in the first weeks, which made the scores a little bit lower. Still, the number shows that students tend to work harder in the fifth, sixth, and seventh weeks of the term, which is why their scores are higher during those times. This is probably because they know that if they don't get at least a 50%, they'll have to retake the course, which makes them work harder [45].

But after the eighth week, the average rate went down, which shows that students were less interested. This is probably because students who tried their hardest in the first few weeks but couldn't improve their grades see no reason to keep going with the course. This makes fewer students sign up and participate in the class.

Statistics from the course show that the average percentage of students who passed the course is lower than the average percentage of all students who took the course. This could mean that a lot of students didn't meet the passing requirements. This could be because the course was hard, they didn't study enough, or something else outside of their control [45].

Even though the average grade for those who passed the course is better than

the average grade for all students, this does not mean that the course is easier for those who pass. It's possible that the standards for passing the course are tougher or that the students who didn't pass did worse generally [45].

Chapter 4

Discussion and Results

4.1 Results

Based on the polls that were taken, the following can be said. First of all, students' lack of English skills really affects how interested they are in computer lessons. This is proven by the fact that more than 40% of people who took part in several polls said that the language barrier makes it hard to understand the basics of programming. When this happens, it's likely that students will have trouble learning the information and taking part in the lessons.

But it should be mentioned that a low level of English doesn't have as much of an effect on how well a student does in a computer class. Only 59.8% of the people who took part in one poll said that there was a clear link between English level and course grades. This shows that the language barrier is not the only thing that affects a student's success in programming, even though it can be hard. Student success can also be affected by things like how hard the student works, how the teacher teaches, and how much the teacher helps the student.

It's important to know that the study's main goal is to find out how bad English skills affect how much students participate in computer lessons. But it's important to remember that students' interest in learning can be affected by things like their interest in the subject, the way they are taught, how hard the material is, etc. So, more study is needed to learn more about all the things that affect a student's

interest in a computer class.

As the poll results show, this means that a student's lack of English skills can make them less interested in computer lessons. But its effect on how well a student does in school is less important. The study also shows how important it is to improve language support and make a learning setting that is open to everyone and takes into account a wide range of factors in order to get students involved in computer lessons.

We used Pearson's correlation algorithm to look at the link between students' final scores in the course on the basics of programming and how well they spoke English. Pearson's correlation coefficient is a statistical measure that tells how strong and in which direction two continuous variables are linked in a linear way.

In our study, a positive correlation coefficient close to +1 would indicate a strong positive link, meaning that as students' English language skills improve, their final grades in the computer course tend to improve as well. On the other hand, a negative correlation value close to -1 would show a strong negative link, meaning that total grades tend to go down as English language skills go down.

We found that there was an association coefficient of 0.246 between how well kids spoke English and how well they did in the end. This number shows that there is only a weak positive association. Even though this shows that students with better English language skills tend to get slightly better final grades, it's important to remember that other things can also affect how well they do in the course.This algorithm you can see from Appendix A part where I have included.

To find out what else could affect students' end grades in the computer school, it may be necessary to do more study and analysis. Still, our results show that there is only a small link between how well someone speaks English and how well they do in school in this case.

A association value of 0.246 which you can see in Figure 4.1 shows that there is a weak positive link between how well you speak English and how well you do in the course on the basics of programming. This means that the two factors have a good link, but it's not very strong. The better the link between two factors, the

closer the correlation value is to 1.

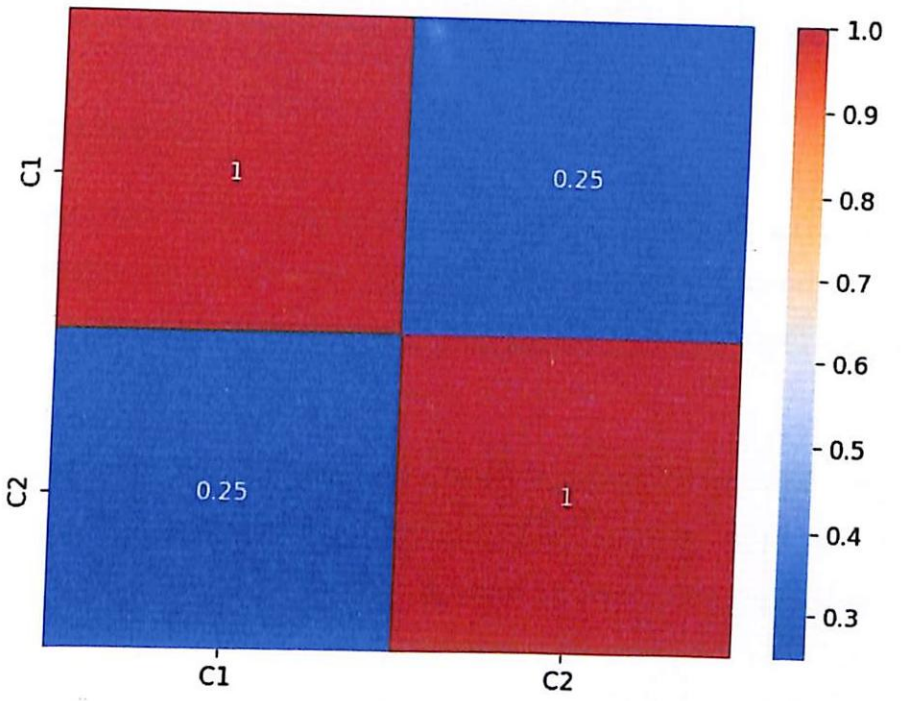


Figure 4.1: Result of correlation by Pearson's algorithm

Based on this finding, it's possible that students who are better at English may also do slightly better in the computer class, but there are probably other things that affect their grades as well. For instance, a student's previous experience with computing or the way they study could affect how well they do in the course.

It is important to remember that correlation does not necessarily mean causation. This means that just because there is a correlation between two variables does not mean that one variable causes the other. Because of this, it would be important to do more study to learn more about the things that help students do well in the computer school.

If improving English language skills is a goal for the students, the teacher or school could think about giving students who may be having trouble with English more tools or help. This could include coaching, language classes, or other ways to help kids improve their language skills.

In the end, there is a small positive link between how well a student speaks

English and how well they do in the basics of programming course. However, there are probably other things that also affect how well a student does in the course. There may be a need for more study and analysis to better understand these factors and find ways to help students do well in the course.

4.1.1 Discussion

pay your attention to an important aspect of learning in programming - the impact of the language barrier on the learning process. Based on the surveys, we have collected data and would like to share with you the overall picture that has developed based on the results.

One of the surveys was aimed at identifying the impact of low English proficiency on student engagement in programming lessons. The results showed that 46.9% of participants have difficulty understanding programming principles due to the language barrier. This demonstrates the need to pay more attention to language support and to develop strategies that will help students overcome these difficulties and actively participate in the lessons.

In addition, another survey was aimed at examining the relationship between the level of English and students' performance in the programming course. In this case, 59.8% of survey participants noted that they notice a connection between the level of English and their grades in the course. However, it is worth noting that 40.2% of the participants did not notice such a relationship, indicating that the language barrier may be only one of the factors affecting student performance. Other factors need to be taken into account, such as the level of effort and support from teachers.

One important point we would like to make is that low English proficiency, while having an impact on student engagement and performance, is not the only factor that determines student outcomes. Engagement in lessons can be influenced by various factors, including interest in the subject, teaching methods, and student support. Therefore, in order to create an optimal learning environment, it is necessary to take into account all these factors and develop appropriate strategies.

So, in conclusion, the conducted surveys confirm that the low level of English

proficiency has an impact on the involvement of students in programming lessons. More than 40% of survey participants confirmed the presence of this problem. However, the impact of the language barrier on student performance is less of a determining factor. More research is needed to better understand all the aspects that affect student engagement in a programming course.

Chapter 5

Conclusion and future work

5.1 Conclusion

The research looked at the connection between students' participation in the university's programming course and their proficiency with the English language. According to the study of survey data, there is minimal correlation between student involvement and English proficiency.

This is supported by survey findings, where more than 40% of students said that the language barrier had no appreciable impact on their participation in the programming course. This suggests that the poor student involvement is not primarily due to the low level of English.

It should be mentioned, nevertheless, that throughout the research it was found that students' engagement was still somewhat influenced by their level of English language proficiency. About 60% of them made the observation that they saw a correlation between their engagement in the programming course and their English proficiency. This could be because communicating with instructors and other pupils is simpler when one has a decent degree of language proficiency.

In light of the findings, it is advised to focus on language assistance and the creation of strategies for bridging the language barrier in order to minimize potential challenges and increase student engagement in the programming course. Furthermore, it's important to remember that factors other than English profi-

ciency affect student involvement. Teaching techniques, topic interest, and teacher support are only a few of the important variables.

The study's findings therefore suggest that participation in the programming course and English language proficiency are related, however this association is less significant. More study in this field might lead to improved methods for teaching programming and fostering a positive learning environment for students with various degrees of linguistic proficiency.

And the next one is The Pearson's correlation coefficient between English language proficiency and grades in the fundamentals of programming course is 0.246. This value suggests a weak positive correlation between the two variables.

The weak positive correlation implies that there is a slight tendency for higher English language proficiency to be associated with slightly better grades in the programming course. However, the correlation is not strong, indicating that English language proficiency alone may not be a major determinant of student performance in the course.

It is important to consider other factors that could influence students' grades, such as prior programming experience, study habits, or other personal characteristics. Further investigation and analysis are recommended to explore these additional factors and gain a more comprehensive understanding of the relationship between English language proficiency and grades in the fundamentals of programming course.

At the end our research we find that low English language proficiency have little impact on engagement of students on programming course. However, it is not only factor that have impact on engagement, it requires future research of other reasons.

5.2 Future work

Future objectives of the study include looking at other factors that can affect students' involvement as well as performing more thorough trials to get more conclusive findings.

Examining Other involvement criteria: Several other criteria, outside English language competency, might affect students' involvement in a programming course. Future studies might concentrate on elements like prior programming experience, topic interest, instructional effectiveness, and peer and faculty support. This will make it easier to identify the elements of the learning process that have the biggest an influence on student engagement.

Performing experiments and controlled studies: Controlled experimentation techniques may be utilized to provide outcomes that are more accurate and trustworthy. For instance, you may combine students with varying levels of English proficiency and perform training sessions or other activities that have been especially created to examine how adjustments to the language assistance effect the students' involvement. These studies will provide more specific and unbiased information on the connection between English language proficiency and course participation in programming.

Analysis of long-term outcomes: Additional study may be conducted to determine how participation in a programming course affects students' long-term success. Tracking students' development in following classes or in their eventual professional jobs may be a part of this study. Such a study will enable evaluation of the long-term effects of students' achievement in the programming profession on engagement and English language competency.

In general, controlled trials, long-term analysis, and examination of other engagement criteria should be a part of future research on the link between English competence and involvement in a programming course. This will deepen our knowledge of how language proficiency affects the educational process and help us create more potent programming learning methodologies for students with various English proficiency levels.

Bibliography

[1] Law of the republic of kazakhstan. on languages in the republic of kazakhstan (as of the legislation on march 13, 2000), 2000.

[2] Trilingualism as one of the priorities of modern education), 2021. URL `https://www.gov.kz/memleket/entities/aqmola-edu/press/news/details/144657?lang=ru`.

[3] Nurmira Zhumay, Saule Tazhibayeva, Azhar Shaldarbekova, Botagoz Jabasheva, Ainur Naimanbay, and Aigul Sandybayeva. Multilingual education in the republic of kazakhstan: Problems and prospects. Social Inclusion, 9(1): 56–62, 2021.

[4] Gulzhan Oralova. Internationalization of higher education in kazakhstan: Issues of instruction in foreign languages. Journal of Teaching and Education, 1(2):127–133, 2012.

[5] Aigerim Seitzhanova, Roman Plokhikh, Ruslan Baiburiev, and Antonina Tsaregorodtseva. English as the medium of instruction: Modern tendency of education in kazakhstan. Perspectives of Innovations, Economics and Business, 15(3):113–117, 2015.

[6] Mazhitayeva Shara, Akhmetova Akbota, Zhunusova Altnai, and Azhigenova Saltanat. Development of languages in kazakhstan. , (4):50–56, 2016.

[7] Aigerim Sadykbekova. Linguistic situation in kazakhstan. Available at SSRN 4116759, 2022.

[8] Wayne C Fredrick and Herbert J Walberg. Learning as a function of time. The journal of educational research, 73(4):183–194, 1980.

[9] D John McIntyre, Ron W Copenhaver, David M Byrd, and William R Norris. A study of engaged student behavior within classroom activities during mathematics class. The Journal of Educational Research, 77(1):55–59, 1983.

[10] Alexander W Astin. Student involvement: A developmental theory for higher education. Journal of college student personnel, 25(4):297–308, 1984.

[11] Vincent Tinto. Classrooms as communities: Exploring the educational character of student persistence. The Journal of higher education, 68(6):599–623, 1997.

[12] George D Kuh, Jillian L Kinzie, Jennifer A Buckley, Brian K Bridges, and John C Hayek. What matters to student success: A review of the literature, volume 8. National Postsecondary Education Cooperative Washington, DC, 2006.

[13] Hamish Coates. The value of student engagement for higher education quality assurance. Quality in higher education, 11(1):25–36, 2005.

[14] Gruzdev I. Foreign research experience of expelled students, year = 2000, url = https://cim.hse.ru/data/2011/05/27/1212557279/7_2011_6.*pdf*, *urldate* = $2010 - 09 - 30$.

[15] Douglas H Heath. Growing up in college. liberal education and maturity. 1968.

[16] Lawrence Kohlberg. Stages of moral development. Moral education, 1(51): 23–92, 1971.

[17] Jane Loevinger. The meaning and measurement of ego development. American Psychologist, 21(3):195, 1966.

[18] William G Perry Jr. Forms of Intellectual and Ethical Development in the College Years: A Scheme. Jossey-Bass Higher and Adult Education Series. ERIC, 1999.

[19] Gary R Pike and George D Kuh. A typology of student engagement for american colleges and universities. Research in higher education, pages 185–209, 2005.

[20] C Robert Pace. Measuring the quality of college student experiences. an account of the development and use of the college student experiences questionnaire. 1984.

[21] George D Kuh. Assessing what really matters to student learning inside the national survey of student engagement. Change: The magazine of higher learning, 33(3):10–17, 2001.

[22] P Terenzini and R Reason. Toward a more comprehensive understanding of college effects on student learning. center for the study of higher education. 2010.

[23] Vincent Tinto. Dropout from higher education: A theoretical synthesis of recent research. Review of educational research, 45(1):89–125, 1975.

[24] Readings B. , 2022.

[25] Penelope Eckert. Jocks and burnouts: Social categories and identity in the high school. Teachers college press, 1989.

[26] Linda M McNeil. Contradictions of control: The organizational context of school knowledge. the institutional context controlling classroom knowledge. final report. 1982.

[27] Arthur G Powell et al. The shopping mall high school. winners and losers in the educational marketplace. NASSP Bulletin, 69(483):40–51, 1985.

[28] Lois Weis. Working class without work: High school students in a de-industrializing economy. Routledge, 2013.

[29] Elaine Chapman. Assessing student engagement rates. eric digest. 2003.

[30] Donald Markwell and Carolyn Daniel. 'A large and liberal education': higher education for the 21st century. Australian Scholarly Publishing Pty Ltd, 2007.

[31] A Fletcher. Guide to students as partners in school change. Olympia, WA: SoundOut. Retrieved, 2(20):08, 2005.

[32] Brenda McMahon and John P Portelli. Engagement for what? beyond pop-

ular discourses of student engagement. Leadership and policy in schools, 3 (1):59–76, 2004.

[33] Fred M Newmann. Student engagement and achievement in American secondary schools. ERIC, 1992.

[34] Sasikala Nallaya. The measurement of change in english language proficiency. Issues in Educational Research, 22(2):149–168, 2012.

[35] Maureen Snow Andrade. The effects of english language proficiency on adjustment to university life. International Multilingual Research Journal, 3 (1):16–34, 2009.

[36] Avary Carhill, Carola Suárez-Orozco, and Mariela Páez. Explaining english language proficiency among adolescent immigrant students. American Educational Research Journal, 45(4):1155–1179, 2008.

[37] Ashok Kumar Veerasamy and Anna Shillabeer. Teaching english based programming courses to english language learners/non-native speakers of english. International Proceedings of Economics Development and Research, 70:17, 2014.

[38] Rex P Bringula, Geecee Maybelline A Manabat, Miguel Angelo A Tolentino, and Edmon L Torres. Predictors of errors of novice java programmers. World Journal of Education, 2(1):3–15, 2012.

[39] Patsy M Lightbown and Nina Spada. How Languages Are Learned 5th Edition. Oxford university press, 2021.

[40] Justin Solomon. Programming as a second language. Learning & Leading with Technology, 32(4):34–39, 2005.

[41] N Vasantha Raju and NS Harinarayana. Online survey tools: A case study of google forms. In National conference on scientific, computational & information research trends in engineering, GSSS-IETW, Mysore, 2016.

[42] Rami Jubrail Haddad and Youakim Kalaani. Google forms: A real-time formative feedback process for adaptive learning. In 2014 ASEE Annual Conference & Exposition, pages 24–649, 2014.

[43] Mireille Djenno, Glenda M Insua, and Annie Pho. From paper to pixels: using google forms for collaboration and assessment. Library Hi Tech News, 32(4):9–13, 2015.

[44] Betty Simanjuntak and Tonni Limbong. Using google form for student worksheet as learning media. International Journal of Engineering & Technology, 7(3.4):321–324, 2018.

[45] Nurzhan Sagyndyk Daulet Akberdiyev Serikzhan Parmanov, Mutaliyev Yelnur. Analysis of students' engagement in an introduction to programming course using data from contest, 2023. URL `https://www.internauka.org/conf/netherlands/30`.

Appendix A

This appendix includes code of correlation. It takes dataset as input and gives as a output correlation coefficient.

```
public class PearsonCorrelation {

    public static void main(String[] args) {
        // Sample data arrays for English language proficiency and grades
        double[] englishProficiency = {4.5, 3.2, 2.7, 4.1, 3.9};
        double[] grades = {85, 75, 60, 80, 70};

        // Calculate Pearson's correlation coefficient
        double correlation = calculatePearsonCorrelation(englishProficiency,
    grades);

        System.out.println("Pearson's correlation coefficient: " +
   correlation);
    }

    \textbf{// Method to calculate Pearson's correlation coefficient}
    public static double calculatePearsonCorrelation(double[] x, double[] y)
    {
        int n = x.length;

        // Calculate means
        double meanX = calculateMean(x);
        double meanY = calculateMean(y);

        // Calculate standard deviations
        double stdDevX = calculateStandardDeviation(x, meanX);
        double stdDevY = calculateStandardDeviation(y, meanY);

        double sum = 0;
        for (int i = 0; i < n; i++) {
            sum += ((x[i] - meanX) / stdDevX) * ((y[i] - meanY) / stdDevY);
        }
```

```
30
31          // Calculate Pearson's correlation coefficient
32          double correlation = sum / n;
33
34          return correlation;
35      }
36
37      // Method to calculate the mean
38      public static double calculateMean(double[] data) {
39          double sum = 0;
40          for (double value : data) {
41              sum += value;
42          }
43          return sum / data.length;
44      }
45
46      // Method to calculate the standard deviation
47      public static double calculateStandardDeviation(double[] data, double
        mean) {
48          double sum = 0;
49          for (double value : data) {
50              sum += Math.pow(value - mean, 2);
51          }
52          double variance = sum / (data.length - 1);
53          return Math.sqrt(variance);
54      }
55  }
```

Listing 1: Java Code