

12-15-2022

Curriculum Development in Technical Education for Boys and Girls Club

Damanpreet Singh
Grand Valley State University

Follow this and additional works at: <https://scholarworks.gvsu.edu/gradprojects>



Part of the [Databases and Information Systems Commons](#)

ScholarWorks Citation

Singh, Damanpreet, "Curriculum Development in Technical Education for Boys and Girls Club" (2022).
Culminating Experience Projects. 226.
<https://scholarworks.gvsu.edu/gradprojects/226>

This Project is brought to you for free and open access by the Graduate Research and Creative Practice at ScholarWorks@GVSU. It has been accepted for inclusion in Culminating Experience Projects by an authorized administrator of ScholarWorks@GVSU. For more information, please contact scholarworks@gvsu.edu.

Curriculum Development in Technical Education for Boys and Girls Club

Damanpreet Singh

A Project Submitted to

GRAND VALLEY STATE UNIVERSITY

In

Partial Fulfillment of the Requirements

For the Degree of

Master of Science in Applied Computer Science

School of Computing and Information Systems

December 2022



The signatures of the individuals below indicate that they have read and approved the project of Damanpreet Singh in partial fulfillment of the requirements for the degree of Master of Science in Applied Computer Science.

<name of project advisor>, Project Advisor Date

<name of GPD>, Graduate Program Director Date

<name of unit head>, Unit head Date

Abstract

Technical education has been and will continue to be more and more important to succeed in the future. The Boys and Girls Club, founded in 1860, is a national organization of local chapters which provide voluntary after-school programs for young individuals. The Boys and Girls Club have life-changing programs that prepare the young individuals in the club for their future whether it's for college, career, or life. The perfect way to prepare best prepare these kids for the future is to develop their technical education. Unfortunately, the boys and girls club of Muskegon has a lack of educational resources for developing technical skills for young individuals. This master's project seeks to fill that gap. This project saw the development of curriculum material as well as a model for creating future educational modules. Four modules were created during this project: cyber safety skills, front-end programming, Python basics, and learning the hardware components of a computer. The modules were developed in a way that the instructor would not have to have a background in such knowledge. Different tools and activities were included in each module to engage students in an active learning exercise.

Introduction

This project is a course curriculum development for technical education for the Boys and Girls Club. There is a lack of foundation for learning technical knowledge in the educational program at this nonprofit club. The goal of this project was to develop a program where technical education would be incorporated into the current curriculum programs. To help the Boys and Girls Club, five modules were developed to help with advancing many of these needed skills for these young individuals. Each of these modules was very different from the other and involve various activities that were created to keep the kids of the club engaged. The curriculum that was made for this project was also separated into age groups which was to ensure each age group was

taught technical education relevant to them. Two days out of the week, trips were taken to the Boys and Girls Club of Muskegon, and meetings were organized with the directors to see what was most important for the kids to learn in this type of education. There were many modules that the directors of the club wanted to incorporate into this club to further the education of the kids but focusing on the most important first and develop a structure for future ones to be created.

The Boys and Girls Club of Muskegon opened recently to provide a place for kids to go after school. Many of the children attending these clubs plan on attending college after they graduate high school and with my project, I plan on making them prepared as much as possible. Having technical skills is a necessity in today's time because everything is online and many of these kids have laptops provided by their school. Many of the students that attend this club have little to nontechnical knowledge and did not grow up with laptops or desktops, so some of the curricula that were made for this project were to increase such knowledge.

Kids come from different backgrounds in this youth club, and it is designed to be a safe place for youth to come to after they are done with school. This project steps away from traditional classroom practices and is designed to make learning fun. The modules have valuable skills that will be useful to learn. The modules are designed to help spark interest in the technology field early for the youth enrolled in this club. When most students think of programming, they get intimidated and think of it as way too hard or have a wrong perspective of it. The programming modules are designed to have a less intimidating structure with lots of activities that are designed to be fun and interactive. Providing the resources and knowledge of programming is a great way to inspire the youth interested in the field of technology to pursue further.

Background/Related Work

Some of the related work to this project, course curriculum development, is YouTube or Udemy. YouTube is a great free resource for learning new technologies and advancing skills that is available to anyone anywhere. There are millions of related videos on YouTube that could correlate to these specific modules that are in these projects. YouTube has many videos related to some modules. The advantage of YouTube is that it is video based, and you could learn at your own pace and more in-depth knowledge could be gained on hard to learn topics. A weak point of YouTube is that there are millions of videos on one topic that you may want to learn. It is hard to know which video is worth watching and credibility is also a big portion. Anyone could post on YouTube on any topic, so it is difficult to trust every single video. There are videos posted by verified YouTube professionals that are more trustworthy but there are not a lot of them.

Udemy is used globally for teaching and learning many skills. Udemy has over 200,000 online courses so there are courses for nearly everything. Udemy is also taught by professionals with a degree. With Udemy there courses are outlined very similar to the modules in this project. They have units, lessons, goals, and activities for every course listed. The problem with Udemy is that it can be very expensive, and they charge for every course. For a non-profit organization, this cost can be added up and might make it difficult in their budgeting. This project provides the Boys and Girls Club with free modules instead of a paid course subscription so budgeting this into their costs would not be a problem.

Methods

Modules were in a hierarchical structure where the most important skills to gain were created and designed first. The first module created a structural basis for the rest of the modules. The board of directors of the Boys and Girls Club was open to any of the ideas provided for modules. The first module of cybersecurity was created in a way where it set the stage for the other modules to follow, so it was sort of like an outline so other modules would be created the same. It included a Prerequisite portion where it explained the software that should be installed before the module itself was to begin. Some of the prerequisites included things like hardware requirements, base knowledge, and links to software installation. Modules were divided into units and each unit included many lessons. Each lesson has flashcards linked to them so that the youth could practice the key terms for that lesson. The PowerPoint presentations use the software named Pear Deck. Pear Deck is an add-on to your browser that is free, and it is the best way to keep students engaged. It adds formative assessments and questions that are interactive to your presentations right from Google Slides which is the other software that is being used. Youth can join the Pear Deck session from any web browser by entering the session code. As the instructor advances the Google Slides, the students will be prompted to answer the questions given, and those answers are displayed on the teacher's dashboard.

The other three modules that were completed during this project were Python, Hardware components of a computer, and web development. These were designed in the same structure as the first module, and it was easier to develop these, and future ones will be designed in the same manner. Activities and software were different for each module and required installations are all written down in the prerequisite portion. Each module is not related to each other's so instructors could jump around to any module and no previous knowledge of the other modules is required.

The limitation of technology was also something to take into consideration with this project. The Boys and Girls Club had laptops provided to them but were chrome books, so the hardware had to be taken into consideration for some of the modules. The recommended Visual Studio code was unable to be installed on the devices owned by the youth club. One of the modules required a python IDE which has system requirements that chrome books do not have. An online python compiler was necessary to run some of the code and to complete the python module. The prerequisites have some python IDE that is available online for free with the best one being recommended first. These online python IDEs were tested and are easy to use and don't require software to be downloaded on your device. The best-recommended python development environment available online for free is Google Colab. Colab uses Google Cloud to allow anybody to write and execute python code right on the browser. Colab also requires no configuration, it has access to GPUs free of charge, and it also has easy sharing. The python module has various fun projects and activities for youth to try and experiment with and hopefully spark creativity.

The web development module is very important. HTML and CSS are very simple to learn and is a valuable skill to learn. The module is structured in a way where it teaches how to make simple web pages and then gives the freedom to youth to explore and try different things along the way. This module is mainly taught with Google slides and split up into chapters with HTML starting first and then going into CSS. This module also hits a section on JavaScript and teaches the youth how to implement it inside your HTML and CSS code. W3Schools was found to be a useful tool for online code editors. With W3Schools you can edit HTML, CSS, and JavaScript code and view the results right from the browser. This diminishes the need to download web development software to your device.

The fourth module, learning the hardware parts of a computer, consists of a physical lab. Equipment for this module was purchased from the Grand Valley surplus store. This module consists of a PowerPoint with a picture representation explaining each hardware component of a computer. Youth in the club will have the tools necessary to strip down the computer and put it back together. This module also includes a tutorial on installing Linux distribution software. Youth will learn the different terms related to hardware components such as CPU, RAM, Memory, etc. This module is very hands-on, and instructor knowledge of basic computer components may be helpful but not necessary.

Results/Discussion

The first module was taught to an administered small classroom in the Boys and Girls club to see how instructors and youth were reacting to the structure and materials of it. After the first couple of units, we received feedback from the instructor on what needed to be improved in the delivery of the modules. The youth were learning quite well and were intrigued. The activities were very well enjoyed by the youth, and they helped in learning the concepts quicker. Time was recorded on how long each unit, lesson, and activity would take so estimations could be provided in the modules, so instructors could plan accordingly.

After teaching the first module, we were able to adjust this module and the other modules too based on the feedback. We realized that we had to make it more entertaining and not like a class in school. This came up with adjusting some of the activities to make them more fun and allow more freedom in the workshops. The youth in the club enjoyed the game that came with the cyber safety module, and it was easier to focus on that. We realized that more time had to be allocated to the game as students were not able to finish the game on time and there is no way to pick up where a user left off in the game.

Delivery of the other modules is necessary and will be conducted in the future. One weakness is that not all the modules have not been taught to the youth and therefore not thoroughly tested. It is difficult to determine if the modules need to be adjusted until delivery of them has been performed.

Conclusions

This project is focused on course curriculum development of the Boys and Girls Club of the lakeshore. Unfortunately, the Boys and Girls of Muskegon have a lack of educational resources for developing technical skills for young individuals. The four modules that were created in this project were cyber safety skills, front-end programming, python basics, and learning the hardware components of a computer. The modules are still not all the way completed and structure and activities will need to be constantly adjusted with given feedback. No technical background is needed for the instructor as many volunteers do not come with this background. Four modules are just the beginning, and more modules will be created in the future. The four modules need to be further tested to see what improvements need to be made before actual implementation is to be done.