BE 605 - PROJECT MANAGEMENT

Professor: Peter Carr

Final Project Report

Teachers without Frontiers

Team 9: Grade 6 & Grade 7 General Science

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1. EXECUTIVE SUMMARY

Students in the Project Management course BE 605, at the University of Waterloo, have spent the semester working with Teachers Without Frontiers. Teachers Without Frontiers is a development program with the aim of empowering teachers in remote areas by augmenting their knowledge and skills through innovative learning opportunities. The goal of the project for this course was to provide Pakistan teachers with information pertaining to the Pakistan curriculum. Teachers would use the information to augment their existing knowledge and provide Pakistan students with high quality education [1]. Students from the BE 605 course were divided into teams with the purpose of providing resources for specific parts of the curriculum. This report focuses on team 9 and the curriculum areas of Grade 6 and Grade 7 General Science. Team 9 consisted of 9 members with unique backgrounds that were helpful in completing the project.

The project objective was to provide Pakistan teachers with resources relating to the appropriate curriculum. A resource library already existed; however, the science curriculum had been updated so not all resources remained relevant. The goal of the team was to review the library's current resources, to eliminate ones that no longer matched the Pakistan curriculum, and add additional quality resources. Some units of the updated curriculum did not exist previously, so all resources collected for these areas were new. A project scope was developed that defined work to be completed and ensured that client guidelines were met. The team created a seven-step plan of action that involved the allocation of roles, work distribution, preparation of status reports, weekly meetings with the Project Sponsor, bi-monthly meetings with the Project Client, and completion of the final report and video presentation. The team had two quality managers, one for each grade, that ensured all resources collected were of high quality. A contingency plan was developed to ensure the team avoided delays and issues and followed the team schedule. Time management and group communication was vital throughout the project. Overall, the project ran smoothly, and the team did not encounter any delays or issues.

Team 9 provided Teachers Without Frontiers with 1,312 resource links for the Grade 6 and Grade 7 General Science curriculum. All resource links fit into one of four category types: videos, articles, quizzes, and games. For grade 6, 460 new resources and 199 existing resources were provided for a total of 659 links. A total of 653 resources were collected for grade 7 including 496 new resources and 157 existing resources. Most resource links added were articles since they do not use much data when downloading. This was important since rural areas often do not have high-quality internet. The team also ensured all resources collected matched the Pakistan curriculum, were accessible without having to create an account or sign up to a website, were all secure websites with no threat of viruses, and did not go against Pakistan religion or beliefs. In the future, Teachers Without Frontiers could add a feedback system for teachers to comment on which types of resources they preferred, what links were most useful, and why. A usage bar could also be added to indicate the number of times each link was accessed. This would allow future teams to assess the existing resources more effectively.

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2. INTRODUCTION

Over the past three months, Masters students from the University of Waterloo have been working with Teachers Without Frontiers (TWF) in conjunction with the Project Management course BE 605 under the mentorship and guidance of Professor Peter Carr. TWF is a development program designed to empower teachers in remote areas by providing them with materials to support the local academic curriculum while augmenting their knowledge and teaching approaches. The project is focused on delivering Pakistani teachers with articles and other resources matching their curriculum in specific areas. The program provides continuous professional development for teachers in remote areas of Pakistan, where access to learning is difficult. Teachers are provided with the information needed to deliver quality education to students in these rural and remote areas [1]. A survey conducted in 2018 revealed that only 53% of the rural population was literate, where literate means: "Ability to read and understand a simple text in any language from a newspaper or magazine, write a simple letter and perform a basic mathematical calculation (i.e. counting and addition/subtraction)" [2]. The efforts put into helping the teachers increase their knowledge and will directly impact the quality of education delivered. By providing teachers with information and knowledge pertaining to the Pakistan curriculum, literacy rates are likely to increase overtime.

Students from the BE 605 course were divided into 15 teams tackling different areas of the Pakistan curriculum. In this report, team 9 has focused on Grade 6 and Grade 7 General Science curriculum. The objective of team 9 was to expand and update the Grade 6 and Grade 7 General Science teaching material on The Technology Enabled Education Resource Library with high-quality learning resources to achieve the desired student learning outcomes (SLOs). The following objectives were developed to complete the project in accordance to the TWF requirements. One objective was to support TWF's effort to provide a tech-enabled learning platform for teachers in Pakistan. This was completed by providing free online resources to teachers in Pakistan through the TWF library. The information gathered will enhance teachers' capabilities of delivering information to students. The pre-existing resources in the TWF library were crossed checked with the updated Pakistan curriculum to ensure appropriateness and additional resources were added to enhance the library. The resources were compiled using a Tiny URL format which allowed quick access and a user-friendly interface for teachers and students, on either a computer or mobile device.

This project report presents the project implementation and the phases that were followed over the past three months. The project plan will be discussed providing a clear project scope and the action plans developed by team 9. The details of the project plan's implementation will be reviewed and described, followed by the project results and

achievements. In the project results section, data will demonstrate the advances made during the implementation of the project. The final section of the report presents recommendations and areas for improvement that will benefit TWF.
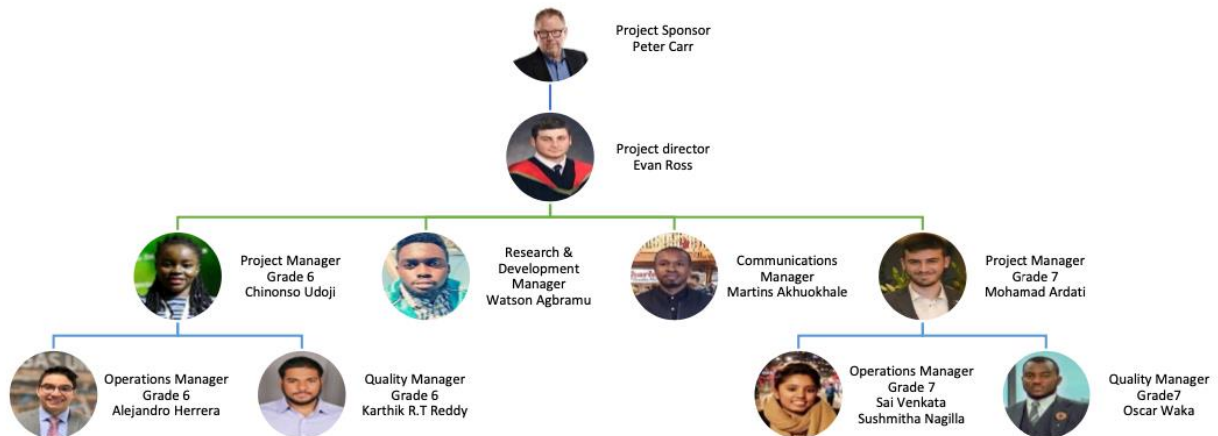
Team 9 was organized as follows:

Figure 1: Roles & Members of the Team

Table 1: Roles & Responsibilities

ROLE	RESPONSIBILITIES
Project Sponsor	- Approve project plan and final project report. - Approve weekly status report of project. - Assist the team with possible solutions where necessary. - Interact directly with client on project requirement and changes. - Evaluate the quality of the presented work/resources.
Project Director	- Oversee the entire project from start to finish and develop team schedule. - Resolve team differences. - Present status report to Project Sponsor. - Ensure the quality of resources. - Liaise with the Project Managers on work progress.
Project Manager	- Develop team schedule. - Present status report to Project Director. - Get progress status from Operations and Quality managers. - Ensure that team performs required tasks promptly. - Communicate with Project Director.
Communications Manager	- Respond to communication issues promptly. - Prepare detailed status report. - Organize and inform members of team meetings.

	- Manage both internal and external meetings.
Research & Development Manager (R&D Manager)	- Document research and development phases. - Manage client relationship and perform reviews based on client needs. - Understand client expectations. - Completes technical evaluation of new resources. - Evaluate and make recommendations concerning the new resources.
Quality Manager	- Examine the quality of each resource and the final compiled work. - Dismiss poor resources that do not meet requirement. - Develop quality control and assurance processes. - Ensure resources adhere to client needs.
Operations Manager	- Manage the team to ensure effective execution of task. - Identify potential risks and seek appropriate solutions. - Ensure that project deliverables meet client expectation. - Conduct team performance review. - Conduct bi-weekly project status meeting.

To ensure proper communication and implementation throughout the project, team members were in constant contact regarding risks or issues and prompt solutions were discussed. Thanks to the great effort of all the project team members, all milestones of the project were completed on time with no delays in any deliverable. The high quality of resources uploaded to the course's spreadsheet will provide Pakistan teachers with educational information that will enhance their teaching abilities. These resources will support TWF in achieving its goal of continuously developing teachers to the benefit the community.

3. PROJECT PLAN

3.1 Project Scope

The project scope defined all work to be completed on this project and ensured the client's guidelines were followed. The scope served to highlight the project objectives and removed any uncertainty with regards to the project's intentions. This also avoided scope creep, which is when a project moves away from the set project objectives.

The following points were the tasks completed within the scope of the project: Conducting a thorough study of Grade 6 and Grade 7 General Science material; recognizing and understanding the required topics to be covered in the project.

- Comparing the new Pakistan national curriculum with the existing University of Waterloo online library for Teacher's Without Frontiers while reporting and correcting any inconsistencies between the two.
- Supplying resource materials in multiple media formats such as documents, videos, and games.
- Ensuring the resources are accessible on both computers and mobile devices through the use of TinyURL.
- Reviewing updated material to ensure the content is in line with the Pakistan culture and can be appropriately used in schools.

In addition, some out-of-scope examples were provided to further clarify the project's intentions. The following task examples were considered irrelevant to the project scope:

- Providing learning resources that are irrelevant to the Grade 6 and Grade 7 General Science material or syllabus units.
- Editing or updating the supplied Pakistan syllabus.
- Creating new learning resources.
- Uploading files and documents to the Teachers Without Frontiers website.

3.2 Resource Assessment

The Pakistan curriculum was updated, so some of the existing resources from previous project groups became irrelevant. Some topics were also introduced into the updated curriculum, which required the team to find new resources that would provide adequate knowledge on these subjects.

Following the boundaries set by the scope above, the team produced a group of criteria for assessing the resources:

- Resources should be mapped to the subjects covered in the Grade 6 and Grade 7 General Science curriculum.
- Resources should be diverse and include a variety of media such as articles, interactive games, tutorials, videos, and quizzes.
- Resources should be appropriate for the student and teacher audience.
- Resources must be free to use and accessible through TinyURL.

Existing resources gathered from the TWF website were verified and updated into the TinyURL format using the TinyURL website. New resources were collected from various sites and documents found online using Google search engines were also submitted in the form of TinyURL.

3.3 Plan of Action

To accomplish the set objectives within the scope boundary, the team developed a project plan of action. It was essential to ensure that the project plan was flexible enough to accommodate the changing schedules of team members while aiming for the best quality work that could be done during the timeline. The project strategy also ensured the Project Client that the SLOs were appropriately mapped and followed the set requirements. Through the project initiation and project plan drafting meetings, the team created a plan of action to be used as a benchmark for its work. This included team communication, role allocation, task distribution, weekly status report, weekly seminars and client meetings, final report and presentation, and a virtual celebration.

STEP 1 - Team Communication

1. A WhatsApp group was created to communicate less-critical updates, concerns, or issues related to the project. It was also used to follow-up on any pending tasks or minor questions.

2. The Professor provided a google spreadsheet for sharing and storing updated resources.

3. The WebEx meetings tool was used for full team video conferences every Monday and Friday throughout the project in addition to smaller meetings that were needed for each subgroup.

4. Documents produced were shared by Email for collection and review.

STEP 2 - Roles Allocation

The team members were assigned different roles to contribute to the project. The group consisted of a Project Sponsor, a Project Director, two Project Managers (Grade 6 and 7), two Quality Managers (Grade 6 and 7), two Operations Managers (Grade 6 and 7), a Research and Development Manager, and a Communications Manager. Roles were assigned according to preference votes completed during the project initiation meeting.

A clear set of responsibilities were designated for each role, aside from working on the group tasks. The team decided to give all team members relatively equal amounts of work to contribute to the development of the project to ensure that everyone had similar opportunities to learn and progress.

STEP 3 - Task Distribution

In total, Grade 6 and Grade 7 had 16 and 15 units to be updated, respectively. The resource collection tasks were distributed over six weeks and divided equally among three subgroups, except for one subgroup which had one additional unit for one week. Upon further review, the Grade 7 General Science curriculum was missing Unit 5 which compensated for the subgroup that had one additional unit. The rest of the project timeline was dedicated to preparing the project reports and the presentation. Each subgroup was responsible for dividing the weekly tasks among its members equally.

STEP 4 - Weekly Status Report

After each subgroup verified and updated the assigned resources for the week and added them to the spreadsheet as TinyURL, a weekly report was drafted and prepared by the

Project Director. The purpose of this report was to record the completed objectives and to log any problems encountered each week. Also, the report presented the tasks assigned for subgroups to accomplish in the upcoming week. The report also included colour coding such as green, yellow, or red to indicate the project status for the week. Green indicated the project was proceeding as planned, yellow indicated there were some minor issues that needed to be resolved but the project was still on track, and red indicated that the project had at least one serious issue which needed to be resolved immediately in order to ensure project completion.

STEP 5 - Weekly Seminars and Client Meetings

The weekly status reports, as explained above, were submitted on LEARN every Monday. The status reports were then reviewed by the Project Sponsor during course seminars every Tuesday. The Project Sponsor suggested improvements to the status reports and spreadsheet if applicable. The team was also able to ask the Project Sponsor any question they had about the project during these weekly seminars. Also, meetings with the Project Client, Fida, were held every other week on Wednesday. In these meetings, the client answered any questions that were raised by the team as well as questions raised by other teams working on different portions of the Pakistan curriculum.

STEP 6 - Final Report and Presentation

To complete the project, a final report and a presentation were required to inform the Project Sponsor and Project Client about the successful conclusion of the project. The team formed three subgroups and allocated sections of the final report to each. The Project Director assembled this report and all other team members suggested

improvements where necessary. The video presentation involved each team member creating slides that illustrated their sections in the final report. The slides were then formed into a PowerPoint presentation which the group narrated to create the final video presentation. The final report and video presentation were then submitted on LEARN for the Project Sponsor and Project Client to review.

Step 7 - Virtual Celebration

To celebrate the project completion, team nine is arranging a virtual party due to COVID-19 restrictions, making sure to choose a time when all team members are available. This event will be held after all team members have completed all of their courses this semester.

3.4 Quality Assurance Plan

The quality assurance plan focused on assessing the efficacy and performance of the project by reviewing and analyzing the outcomes and impacts. Team 9 was equally divided into three subgroups with three members in each subgroup. Each week one of the subgroups worked on their assigned SLO's.

The SLOs were equally divided among the team members such that everyone in the group could equally contribute. Every subgroup evaluated the curriculum and found the appropriate URLs, and then updated the existing resources to achieve the final goal and objectives of the project.

To ensure the quality of the resources, every team member in the subgroup assigned to the week's objectives was tasked to review their submissions. In addition, each quality manager revised the content relevant to their assigned subproject (Grade 6 or Grade 7).

The project sponsor provided feedback every week after the subgroup posted updated resources. Each week a status report was completed by the project director that discussed work done for the week as well as any issues faced, and planned work for the upcoming week. The project sponsor provided feedback each week on the status reports and stated any concerns or issues that needed to be resolved.

3.5 Contingency Plan

An effective contingency plan was required in order to avoid any unnecessary project delays. The plan ensured that the team was prepared for most risks and that the project ran smoothly. The risks were discussed and addressed by the team members in the project plan at the beginning of the project, and are listed below:

- *__Helpful responsibility:__* Every team member is assigned with an equal amount of the work and they are expected to finish their assigned tasks every week. If due to any unforeseen circumstances any team member could not finish their work other team members should function as back up and take responsibility to finish the assigned task.
- *__Change Management:__* The change management plan ensures that changes are properly defined, reviewed, approved, and implemented within the project scope and timeline. The project director is responsible for ensuring all changes are properly communicated to the stakeholders and for managing all change processes. The diagram below illustrates the change management processes.
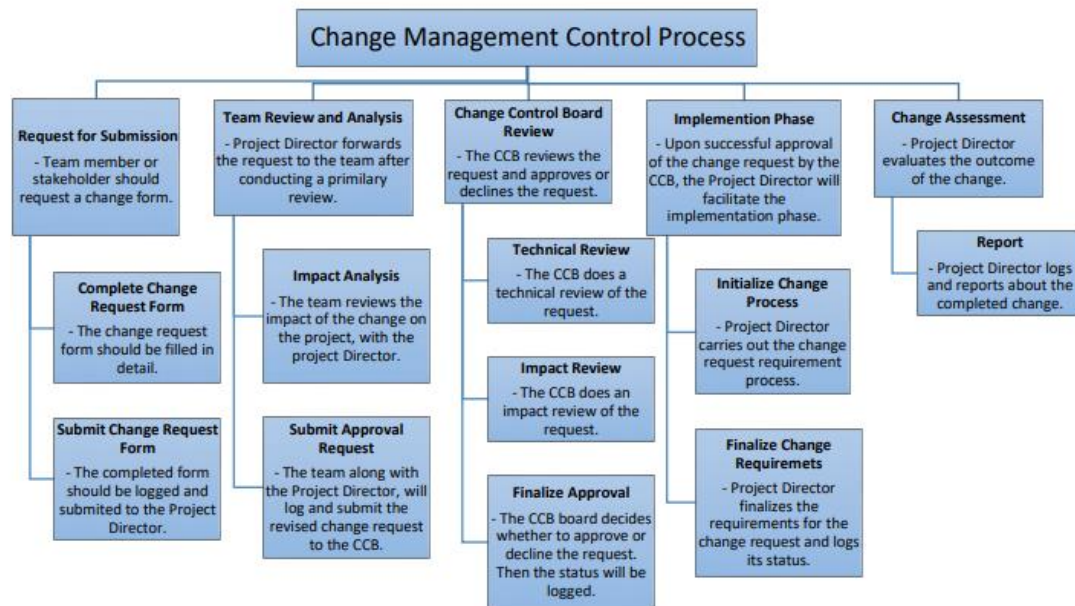
Figure 2: Change Management Control Process

Fortunately, the team did not run into any issues which involved a deviation from the original plan, so the change management process was never used. The team did create a change management request form at the beginning of the project incase a change did occur which can be seen in Appendix C.

- *__Risk Avoidance:__* It is the responsibility of the team members to evaluate each risk and propose ideas to mitigate them. Constant communication with team members through different platforms and two scheduled meetings a week is essential to ensure the whole team is updated on these issues. Meetings with the project sponsor to review project progress are also scheduled. A risk management register

was created which labelled the likelihood of a risk, impact if the risk occurred, and the severity of the risk with respect to the project as a whole. The team also proposed mitigation strategies for each potential risk. The risk management register can be seen in Appendix D. Fortunately, the mitigation strategies allowed the team to avoid all potential risks and the project was able to run smoothly from start to completion.

4. IMPLEMENTATION OF PROJECT PLAN

After the planning phase, explained in the previous section, the team worked on the tasks of reviewing and finding appropriate resource links in line with the Grade 6 and Grade 7 General Science curriculum. This section describes steps the project team took to complete all stages of the project and reach the designated milestones. The team was divided into three subgroups and assigned sections of the Pakistan curriculum. Existing resource links were reviewed and included if appropriate and additional resource links were added as necessary. The Project Director prepared all weekly status reports and the whole team worked together on the Project Plan, the Final Report, and the Final Presentation.

Task management, resource collection, and resource organization were the three main areas of work and are discussed in this section.

4.1 Task Management

At the beginning of the project, a project plan was produced which included a team schedule and planned the work to be done among the team members. There was a total of 31 units containing 192 SLOs in the Grade 6 and Grade 7 General Science syllabus. During the duration of the project, it was discovered that Unit 5 in Grade 7 General Science did not exist so in total there were only 30 units. It was optimal to divide the work into six weekly batches with approximately five units per week. The SLOs were divided and distributed into three subgroups of three team members each. The role of each subgroup was to review existing resource links to ensure they match the updated curriculum and to find new resource links. The table below indicates the members in each subgroup.

Table 2: Subgroup Members

Subgroup	Member 1	Member 2	Member 3
1	Chinonso Udoji	Evan Ross	Alejandro Herrera
2	Sai Venkata Sushmitha Nagilla	Mohamad Ardati	Karthik R.T. Reddy
3	Oscar Waka	Martins Akhuokhale	Watson Agbramu

Deadlines were set and assigned to each subgroup to complete the project effectively. The table below shows the schedule and management plan of the project.

Table 3: Schedule and Management Plan

Task Name	Start Date	End Date	Duration	Team
Project Initiation	**05/22/20**	**05/24/20**	**3d**	**All Team**
Team introduction meeting.	05/22/20	05/22/20	1d	**All Team**
Project plan task breakdown meeting.	05/26/20	05/26/20	1d	**All Team**
Assigning team roles and responsibilities.	05/26/20	05/26/20	1d	**All Team**
Constructed subgroups to work on project plan draft sections.	05/26/20	05/26/20	1d	**All Team**
Acceptance of Project Plan	**06/02/20**	**06/02/20**	**1d**	**All Team**
Prepare project plan draft.	05/27/20	06/01/20	6d	**All Team**
Meeting with the professor.	06/02/20	06/02/20	1d	**Project Director**
Completion of 1st batch of SLOs – GS (6) unit 1 – unit 3, GS (7) unit 1 – unit 2	**06/02/20**	**06/08/20**	**7d**	**Subgroup 1**
Review relevant GS (6) and GS (7) curriculum.	06/02/20	06/03/20	2d	**Subgroup 1**
Update existing resources using revised content.	06/04/20	06/07/20	4d	**Subgroup 1**
Conduct a quality check following quality plan guidelines.	06/08/20	06/08/20	1d	**Subgroup 1**
Completion of 2nd batch of SLOs – GS (6) unit 4 – unit 6, GS (7) unit 3 – unit 4	**06/09/20**	**06/15/20**	**7d**	**Subgroup 2**
Review relevant GS (6) and GS (7) curriculum.	06/09/20	06/10/20	2d	**Subgroup 2**
Update existing resources using revised content.	06/11/20	06/14/20	4d	**Subgroup 2**
Conduct a quality check following quality plan guidelines.	06/15/20	06/15/20	1d	**Subgroup 2**

Completion of 3rd batch of SLOs – GS (6) unit 7 – unit 9, GS (7) unit 6	**06/16/20**	**06/22/20**	**7d**	**Subgroup 3**
Review relevant GS (6) and GS (7) curriculum.	06/16/20	06/17/20	2d	**Subgroup 3**
Update existing resources using revised content.	06/18/20	06/21/20	4d	**Subgroup 3**
Conduct a quality check following quality plan guidelines.	06/22/20	06/22/20	1d	**Subgroup 3**
Completion of 4th batch of SLOs – GS (6) unit 10 – unit 11, GS (7) unit 7 – unit 9	**06/23/20**	**06/29/20**	**7d**	**Subgroup 1**
Review relevant GS (6) and GS (7) curriculum.	06/23/20	06/24/20	2d	**Subgroup 1**
Update existing resources using revised content.	06/25/20	06/28/20	4d	**Subgroup 1**
Conduct a quality check following quality plan guidelines.	06/29/20	06/29/20	1d	**Subgroup 1**
Completion of 5th batch of SLOs – GS (6) unit 12 – unit 13, GS (7) unit 10 – unit 12	**06/30/20**	**07/06/20**	**7d**	**Subgroup 2**
Review relevant GS (6) and GS (7) curriculum.	06/30/20	07/01/20	2d	**Subgroup 2**
Update existing resources using revised content.	07/02/20	07/05/20	4d	**Subgroup 2**
Conduct a quality check following quality plan guidelines.	07/06/20	07/06/20	1d	**Subgroup 2**
Completion of 6th batch of SLOs – GS (6) unit 14 – unit 16, GS (7) unit 13 – unit 15	**07/07/20**	**07/14/20**	**8d**	**Subgroup 3**
Review relevant GS (6) and GS (7) curriculum.	07/07/20	07/08/20	2d	**Subgroup 3**
Update existing resources using revised content.	07/09/20	07/13/20	5d	**Subgroup 3**
Conduct a quality check following quality plan guidelines.	07/14/20	07/14/20	1d	**Subgroup 3**
Acceptance of Final Project Report	**07/15/20**	**07/24/20**	**10d**	**All Team**
Collect and combine all project accomplishments and major findings.	07/15/20	07/17/20	3d	**All Team**
Interpret main outcomes and suggest actions for optimizing future projects.	07/18/20	07/18/20	1d	**All Team**
Draft project 'Final Report'.	07/19/20	07/22/20	4d	**All Team**
Review and amend initial draft.	07/23/20	07/23/20	1d	**All Team**

Finalize the project report and submit it to professor for review.	07/24/20	07/24/20	1d	**All Team**
Conclude the Video Presentation	**07/21/20**	**07/26/20**	**6d**	**All Team**
Meet to organize outline for video presentation.	07/21/20	07/21/20	1d	**All Team**
Produce the initial version of the video presentation.	07/22/20	07/24/20	3d	**All Team**
Review and update the presentation.	07/25/20	07/25/20	1d	**All Team**
Finalize the presentation and submit it to the professor for review.	07/26/20	07/26/20	1d	**All Team**
Submit work to client and Celebrate	**07/28/20**	**07/28/20**	**1d**	**All Team**

For each resource link collected by team 9, a quality control matrix was completed. This quality control matrix ensured each link met the criteria and scope of the project. The criteria included in the quality control matrix were URL link in TinyURL format with no mistakes, link is working properly and relevant to all course curriculum, and link does not contain any material offensive to Pakistan culture or politics. A completed example of the quality matrix can be seen in Appendix B.

Below are the milestones identified and divided into stages at the outset of the project. All milestones were completed successfully.
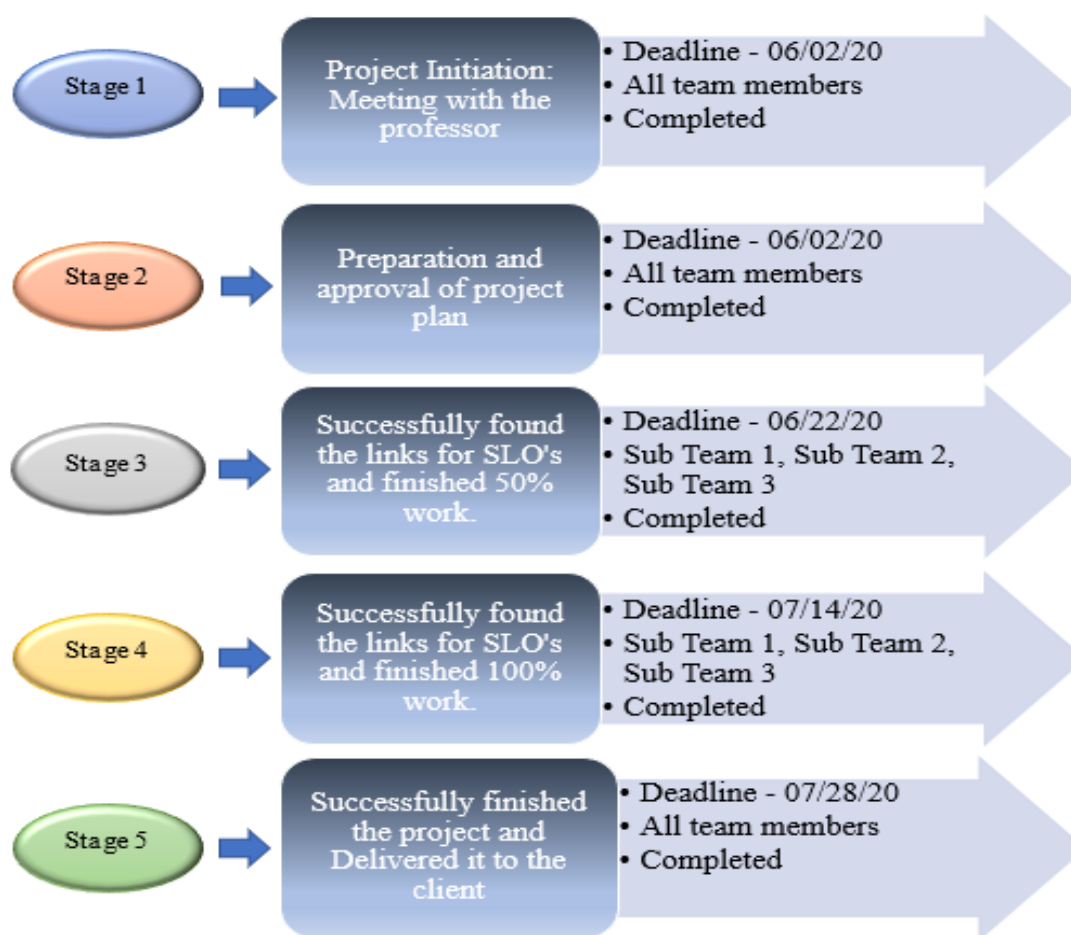

Figure 3: Project Milestones

4.2 Resource Collection

The objectives of resource collection were to verify and update the preexisting links in the Teachers Without Frontiers library in addition to collecting new resources. All links gathered were mapped to ensure that the with the SLOs matched with the updated curriculum. Each team member reviewed existing URLs from previous projects on The Technology Enabled Education Resource Library and added the relevant links to the spreadsheet. The relevant resources were web URLs for online articles, games, recordings, instructional exercises and quizzes that were easily accessible and free to use. The team also worked on finding new resources for the SLOs, which were usually associated with new topics covered in the updated curriculum. Finally, the team converted the resources into TinyURL format and submitted them through the online shared

spreadsheet. The following guidelines were set by the client to ensure good resource collection:

- The resources submitted on the spreadsheet must be free to use.
- The resources should be in TinyURL format for easy accessibility.
- The resources' material should be relevant to the children of Pakistan.
- The resources should follow the SLOs of the Grade 6 & Grade 7 General Science curriculum.
- The resources should provide sufficient and quality information.

4.3 Resource Organization

Every week the assigned team members provided resources for the assigned units following the resource collection methods stated above. At the end of the week, all the information collected was updated onto the shared online spreadsheet. The two quality managers conducted quality checks on the updated spreadsheet and ensured that the links provided followed the mentioned guidelines.

After approval from the project director, project managers and quality managers, the weekly progress report was drafted. These weekly reports were submitted to the project sponsor on the Monday of each week with designated color-coding referring to the week's performance. All weekly reports were submitted with a green mark which indicated that the weekly assignments were performed smoothly as planned.

In order to ensure that the online resources were properly organized on the spreadsheet, the team set a standard format to follow. The weekly reports were all completed by the project director in order to keep a consistent format throughout the project.

5. PROJECT RESULTS

This section of the report details the results that were obtained during the course of the project. It highlights the achievement of evaluating and finding many resource links pertaining to the Pakistan curriculum for General Science grade 6 and grade 7.

In total, there were 1,312 resource links provided for General Science grade 6 and grade 7. This was comprised of both new and pre-existing links relevant to the updated Pakistan curriculum. These links were collected through a span of six weeks with each member of the team being actively involved in their assigned tasks and meeting the appropriate deadlines. Adequate quality checks were conducted to ensure the resources met the TWF standard. The Pakistan curriculum for General Science grade 7 was missing unit 5

and this was reported on the spreadsheet. Hence, no resources were provided for the unit.

In the spreadsheet, a detailed description was given for each resource link provided, as well as its format and whether it was a new or existing resource. The formats of the resources fell into 4 categories which were articles, videos, games, and quizzes. Resource links that included multiple formats were recorded in the category that best reflected its content. In the graphs below, all resources were grouped into the 4 format categories as well as whether they were new or existing links.
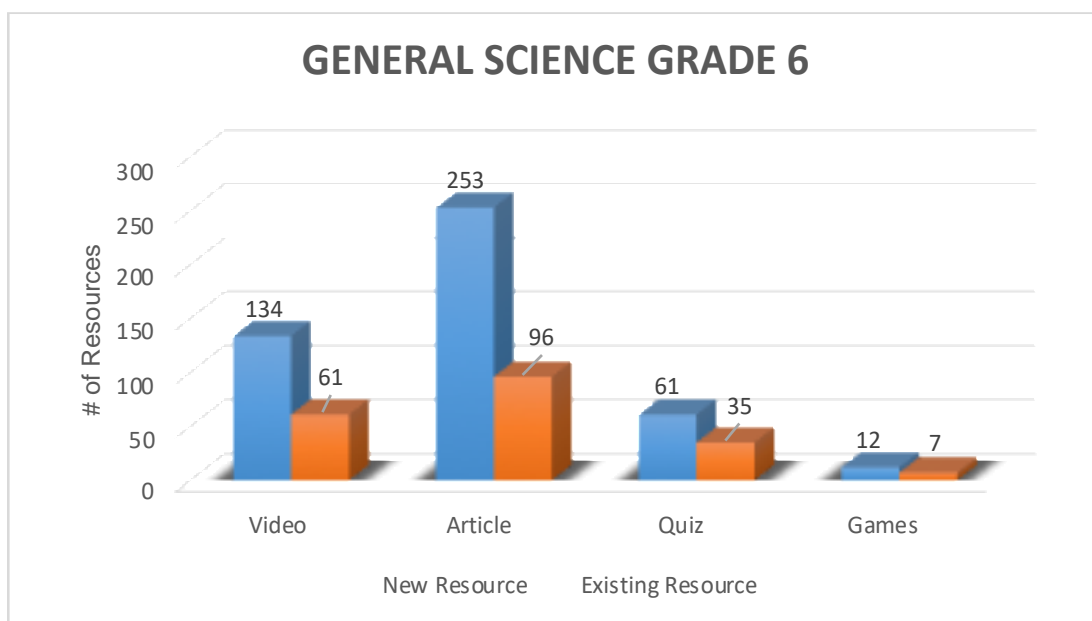

Figure 4: Resource Link Distribution for General Science Grade 6

Figure 4 shows the weighted distribution of relevant links obtained for General Science Grade 6. A total of 659 links were obtained for grade 6.
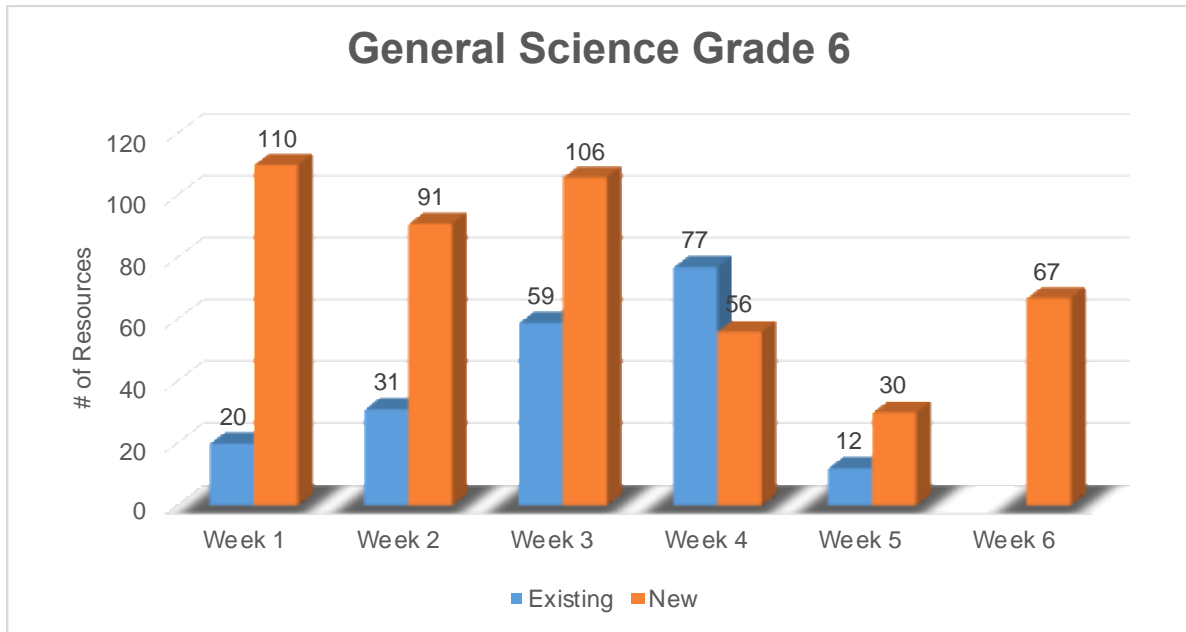
Figure 5: Resource Link Distribution by Week for General Science Grade 6

Figure 5 shows the Grade 6 work done by the team over the six-week project period. The work has been broken down by week. As can be seen, the number of existing resources kept varied. This was because in some units the curriculum had changed more than in others. The week 6 curriculum was completely new which is why there were no existing links provided.
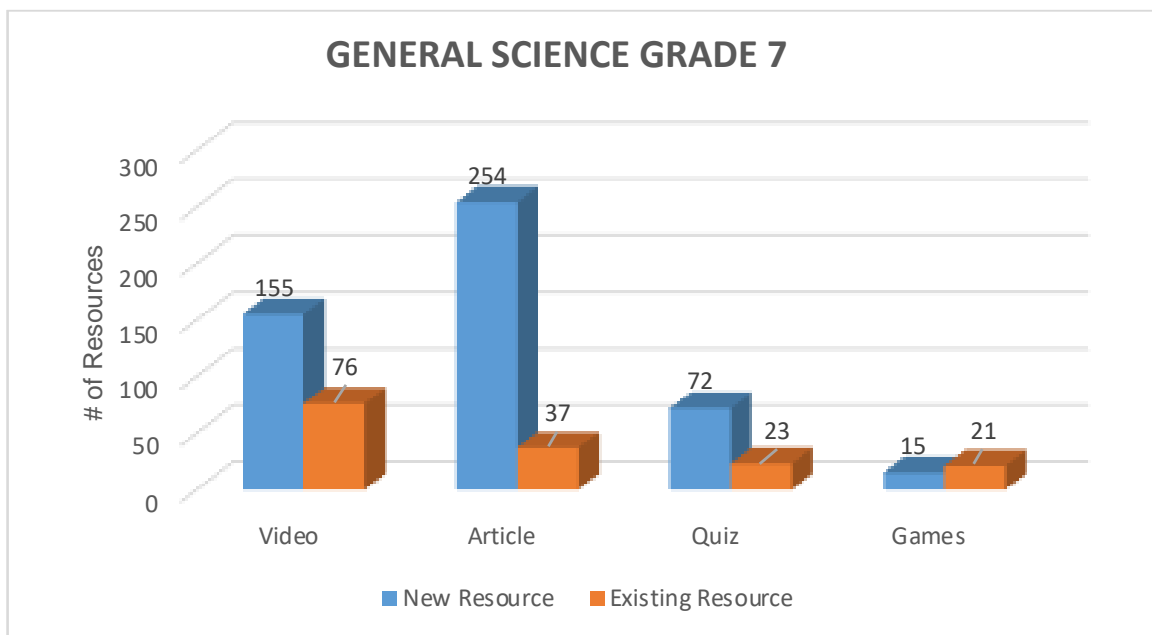

Figure 6: Resource Link Distribution for General Science Grade 7

Figure 6 shows the weighted distribution of relevant links obtained for General Science Grade 7. A total of 653 links were obtained for grade 7.
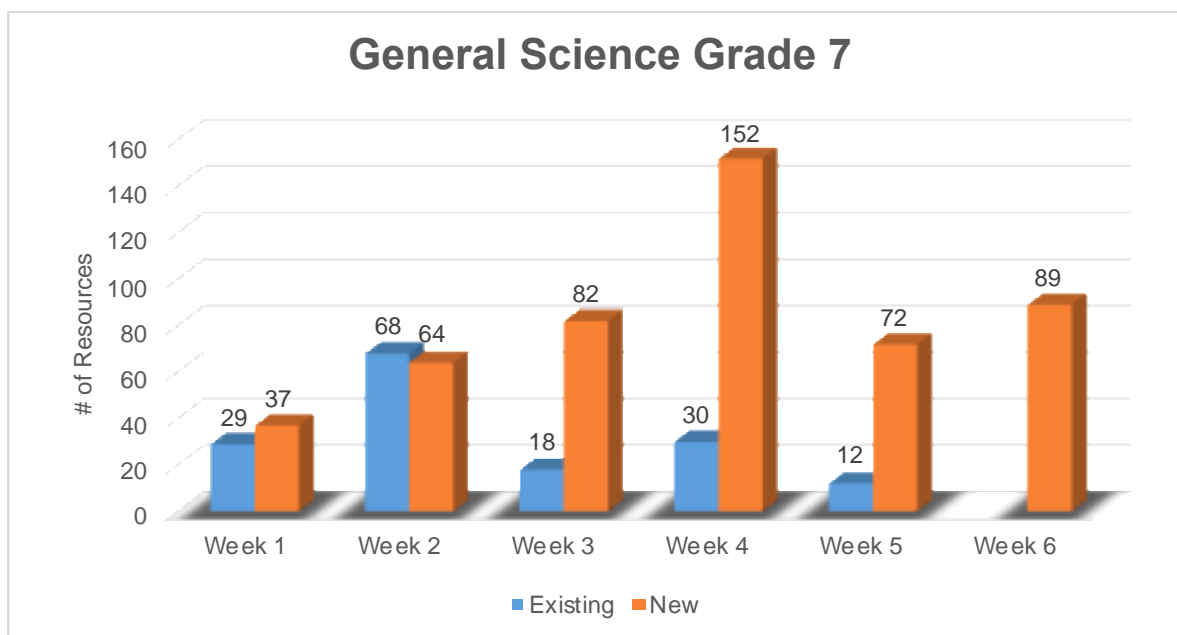

Figure 7: Resource Link Distribution by Week for General Science Grade 7

Figure 7 shows the Grade 7 work done by the team over the six-week project period. Most of the resources collected were new because a lot of the curriculum had changed from the previous year. This is clearly shown when looking at resources collected for weeks 3, 4, and 5. Week 6 involved curriculum that did not exist previously, so all resource links collected were new.

Overall, the majority of the resource links found for both grade 6 and grade 7 were in the form of articles. This was because the team took into account that most Pakistani teachers were located in rural Pakistan areas. In rural areas, often the internet connection is not completely stable so providing teachers with many articles was important as they are downloadable without using as much data. The team also provided a mix of other formats including many videos and some games and quizzes. Quizzes and games were provided in lower numbers than articles and videos because it was more difficult to locate high-quality versions. Also, the majority of resource links collected were new this year. This was due to either curriculum changes or because the existing links did not meet our quality guidelines.

6. DISCUSSION AND RECOMMENDATIONS

The team completed the Pakistan national curriculum for General Science Grades 6 and 7. This comprises all the sections of SLOs as specified by the curriculum. The resources provided include links to articles, games, videos and quizzes which are intended to improve the level of teaching for Pakistan teachers.

The success of the team can be ascribed to the resourceful, effective and consistent approach when searching for relevant resources for the project. The team leveraged the strengths and ideas of each member and devised a friendly atmosphere to work in. This dynamic atmosphere fostered collaboration as well as individual resourcefulness during the completion of the project and enabled achieving team success.

Discussing the project work, the team was able to identify certain procedures that were relevant in achieving consistency in our work. First, the project plan showed a detailed allocation of tasks among team members, as well as specified timelines. This brought clarity about individual team members' expectations. Also, the project plan detailed the procedures to follow for events such as meetings and change requests. The team also ensured that quality control and assurance measures facilitated correctly identifying and gathering resources for the library. The quality and assurance procedures guaranteed that all team members complied with the expected standard. It is important to note that the team considered the audience when sourcing for the relevant materials. Understanding the associated Pakistan curriculum level and ease of comprehension of the resources was crucial when compiling links. Some of the major factors that enhanced productivity during the course of the project were:

> (i) Multiple perspectives: Working in groups helped the team see things from other people's perspectives and enriched the final product. Having an individualistic approach would have negated a multi-perspective view on the project. It is always effective having multiple productive ideas when working in group projects.

> (ii) Communication: During the course of the project, there was high quality communication among all members of the group. This created an atmosphere where team members took turns speaking, felt free to speak when they had ideas, actively listened to other team members contributions, and made crucial compromises for the benefit of the team.

> (iii) Time management: During the course of the project, the team was able to efficiently organize meetups when required and kept on schedule when completing all tasks.

It should also be noted that while gathering project resources, the team encountered several challenges like;

(i) Inaccessible resources: There were several links to resources that were inaccessible. Users were required to create an account to use the site. These resources were considered 'user-unfriendly' and were not included in the spreadsheet.

(ii) Insecure Resources: Some resources were insecure (non https website). Non-HTTPS websites do not provide a secure connection, so they were not included for the safety of the users.

(iii) Resources with too many adverts: The team tried to avoid resources with too many adverts as they were considered too distracting.

(iv) Resources with inappropriate messages: The team also avoided resources that went against the Pakistan religion and culture. It was ensured that the team did not include any resources that the users would consider offensive.

(v) Resource Data Consumption: Since the resources will mainly be used by teachers in rural areas, the team included resources that would not consume large amounts of data, like articles, as network conditions in rural areas may not be favorable.

(vi) Resource Quality: The team avoided resources that were not well detailed and did not meet the SLOs.

For future work, it should be noted that some changes could positively impact the quality of work delivered. The team recommends that future teams should follow the previously discussed factors that influenced the success of the project. These factors include encouraging multiple perspectives, high quality communication, and effective time management practices. Also, while reviewing the library, the team identified that having a usage analysis status bar for the existing resources would have been beneficial to the project. This usage analysis status bar would have conveyed the level of relevance or impact of existing materials by displaying the number of times each resource was used. Hence it would have aided the decision-making process when reviewing the library. Low usage resource links could then be eliminated. The usage information would also indicate which types of resources were most used by the Pakistan teachers. Also, integrating a feedback system or comments section for all participants of the library regarding usefulness and relevance of the resources to the SLOs would be beneficial. This feedback, coupled with the usage analysis status bar, would provide clarity on the

relevance of the resources. If teachers are sharing resource links directly with students, it is possible that some students may have learning disabilities which hinder their use of the links. In the future, teams undertaking this project could adapt the content to accommodate all students, including those with learning disabilities or other impairments. One final recommendation for TWF to consider would be to introduce a mobile application which would allow for resources to be more easily accessible from a cellular device or tablet. Overall, Teachers Without Frontiers has been doing a great job empowering Pakistani teachers by augmenting their knowledge and skills with appropriate resources. Incorporating the recommendations above would further enhance their ability to empower teachers and provide Pakistani students with high-quality education.

7. REFERENCES

[1] Idara-e-Taleem-o-Aagahi, "Teachers Without Frontiers," Teachers Without Frontiers, 2020. [Online]. Available: http://itacec.org/twf/. [Accessed 18 July 2020].

[2] M. A. Choudhry, "Pakistan: Where and who are the world's illiterates?," United National Educational, Scientific and Cultural Organization, New York, 2005.

8. APPENDIX A: Gantt Chart

This Gantt Chart is the same as the one provided for the Project Plan and was followed without any issues or delays.

9. APPENDIX B: Quality Control Matrix

Quality Control Matrix

Name: Evan Ross

Date: June 5, 2020

Details to be reviewed	Yes	No
URL link is short (TinyURL format)	X	
URL link is working	X	
URL connects you to the relevant material	X	
Content of the URL coincides the material	X	
Content of the URL is free of mistakes	X	
Content of the URL is culturally appropriate	X	
Content of the URL is in the approved language	X	
Content of the URL is from legally free resources	X	
Content of the URL aligns with course curriculum	X	
Content of the URL is continually relevant	X	
Content of the URL does not contain any hate speech	X	
Content of the URL does not discriminate against Religion, gender, culture, lifestyle and violence	X	
Content of the URL is neutral and takes no political sides	X	
Content of the URL is not offensive to any culture or religion	X	

10.   APPENDIX C: Change Request Form

PROJECT NAME		CHANGE REQUEST NUMBER	
PROJECT DIR.			

CHANGE REQUEST			
REQUESTER NAME		DATE OF REQUEST	
REQUESTER CONTACT		PRIORITY	
TYPE OF CHANGE			
CHANGE DESCRIPTION			
ESTIMATED TIMELINE			
WORK DESCRIPTION			
RESOURCES REQUIRED			

AREA OF IMPACT	IMPACT DESCRIPTION	IMPACT LEVEL

CHANGE REVIEW / APPROVAL			
REVIEWER NAME		STATUS	ACCEPTED / REJECTED
REVIEWER SIGNATURE		DATE OF REVIEW	
ADDITIONAL COMMENTS			

11.   APPENDIX D: Risk Management Register

		Current Risk			Status	Owner	Raise Date	Mitigation Strategies	Residual Risk		
Risk ID	Risk	Likelihood	Impact	Severity					Likelihood	Impact	Severity
1	Course Drop	3	4	12	Open		05-30-2020	- Modify Project Plan - Change roles and responsibilities	2	2	4
2	Source Quality	4	4	16	Open		05-30-2020	- Attain to the quality plan when a new source is added. - Review with a double-check each reference and compare it with other sources to validate its information.	2	2	4
3	Online Communication	2	2	4	Open		05-30-2020	- Have constant communication with team members through different platforms. - Schedule periodic meetings with the professor and sponsor to review project progress.	1	1	1
4	Availability	4	2	8	Open		05-30-2020	- Schedule two meetings a week to ensure the presence of all team members. - Have constant communication with team members through different platforms.	2	1	2
5	Update Criteria	3	4	12	Open		05-30-2020	- Attain to the quality plan when a new source is added. - Review with a double-check each reference and compare it with other sources to validate its information.	2	2	4
6	Sponsor Communication	3	2	6	Open		05-30-2020	- Schedule periodic meetings with the professor and sponsor to review project progress.	1	1	1
7	Batch Delay	4	5	20	Open		05-30-2020	- Have constant communication with team members through different platforms. - Request help from other subgroups that for that week have a lower workload.	2	3	6
8	Subgroup Workload	4	4	16	Open		05-30-2020	- Have constant communication with team members through different platforms. - Request help from other subgroups that for that week have a lower workload. - Modify the batch assignment between subgroups.	2	2	4
9	Lack of KPI	3	3	9	Open		05-30-2020	- Create a KPI that represent the progress report and can be updated by every team member.	1	1	1