Faculty of Engineering

Department of Management Sciences

MSCI 100

Revolutionizing Future Team Activities with Decision Support Tool

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Executive Summary

In order for projects to be finished successfully, a tool can be created which will help the group effectively and efficiently complete the project. For this project, the aim was to create such a tool which would benefit this group and others. Starting with a set of limitations, i.e. meeting the specific criteria, the team started the process and planned out the foundation of the tool. Following Belbin's theory,

different roles were assigned to the group members, for example, plant, coordinator, specialist, etc. After researching a study, the main areas of concern were identified through analyzing, and in order to overcome these issues, the team decided to construct a decision-making system with a task manager, a schedule maker and communication initiator.

The actual process of designing a tool commenced with brainstorming and creating the first tool drafts and prototypes. These prototypes had positive and negative aspects, but were further analyzed and criticized in order to create the best tool possible. The first prototype consisted of a schedule, task distributor, and deadline manager and the second was created to improve overall communication between group members. A collaboration of the two tool prototypes were finalized and for maximum success, the tool had to consist of a combination of functions of the prototypes.

Following this, the team members devised a specific in depth plan of what the tool will be and began to construct the basic layout. As progress was made, the functions of the tool were not performed smoothly, therefore to change this, the group decided to organize the tool more effectively by assigning specific sheets for specific tasks, which would result in good organization and clarity for long term projects. Vba and complex forms of coding were conducted in the making of the tool and consequently, in the final draft of the tool, the final functions were added such as task manager, communications, and scheduling. All these components of the tool collectively will aid groups in performing group tasks successfully.

PLANNING AND PROCESS

Objective

The objective of the MSCI term project was to plan, create, and design a decision-making support tool that is able to facilitate projects similar to the MSCI term project.

Project Requirements/Limitations

The project is to be comprised of 5 milestones, all of which challenge groups to submit innovative ideas composed individually and from concepts learned from class lectures/tutorials. In terms of the scope of the project, groups were given considerable freedom with respect to what they can create, however, limitations were still set. In terms of the scope of the project, groups were given considerable freedom with respect to what they could create, however, three important limitations were to be followed. First off, one cannot choose their own team as groups were been prematurely selected. Secondly, groups must schedule towards/around the milestones posted onto the "MSCI Learn". Lastly, it was critical that the decision-making support tool was to be based on Microsoft Excel. A summary of each milestone can be found in "Appendix A: Milestone Summaries".

Team Dynamics

In order to meet milestone deadlines in an efficient and effective manner, Team 14 scheduled personal deadlines in between set milestones. Furthermore, both a constitution as well as individual member roles were set in order to increase organization and productivity. Team 14 delegated roles were inspired by Belbin's Roles, a set of team roles created by Meredith Belbin, a British management theorist. The reason for this is because Meredith Belbin focussed on the positives/negatives of each member. (Belbin, 2017) Doing so allowed team 14's members to be aware of these flaws. These delegations are formulated in "Appendix B: Team Roles" and "Appendix C: Team Constitution" Furthermore, team 14's.

Initial Planning

Before planning of the final tool could begin, team 14 began by researching the largest issues faced by members of a team during a group assignment. A study conducted by Hassan Pournaghshband at the University of Missouri finalized that poor communication and poor leadership were the top two reasons why students had issues during group projects (Hassan Pournaghshband, 1990). (Pournaghshband, 2017) Having this knowledge, team 14 decided to address these two issues in their Excel tool. The team constructed ishikawa diagrams to properly identify the issues faced during group projects. Once, the issues were highlighted, the team was ready to begin the initial planning. The research acquired from

the study is summarized in “Appendix D: Flowchart (Significant Group Project Issues)”. This flowchart also acts as a design criteria moving forward.

Design of Device

Early Brainstorming

After finalizing research, initial planning began. It was decided that the decision-making system would create thorough communication between group members. These features would include a task manager and a schedule maker. This concept revolved around the feature of task distribution. The following ideas were acquired based on analysis of “Appendix D”.

Prototypes

After deciding on the capabilities of the tool, team 14 began to brainstorm on ways to implement the tool. Amongst several ideas, two prototypes were selected to be put onto milestone two. A final choice would be selected after proper analysis was conducted throughout the second milestone. The first prototype heavily focused on Microsoft Excel, where ultimately, a scheduled, task distributor, and deadline manager would be presented to the team. For our second prototype, the team focused more on the issue of communication. The tool would be able to distribute tasks to a custom set of group members. Furthermore, a schedule would be created based on set deadlines. The goal of this prototype was to ultimately improve overall communication between group members based on the progression of certain tasks. As group members began rationalizing the prototypes in depth, it was realized that a combination of both prototypes would result in the most effective decision-making system.

Initial Problems/Rationale

As stated in the paragraph before, team 14 decided to combine both tools, For example, when considering the first prototype, one of the drawbacks was the tool could not divide up tasks. This would have disturbed the algorithm of the tool, and ruined its process flow. As for the other tool, the problem was that it had no process flow. It was merely a one page device, not a tool. To resolve this issue, team 14 decided to combine various features from both tools. This would allow both tools to fulfill what the other one lacked. In the end, the final prototype was a form-based step-by-step system which allowed

users to alternate between a variety of sheets which aid in concepts including but not limited to team communication, task delegation, and scheduling.

Tool Development

Development/Challenges

Initially, team 14 planned on two tabs on the tool, a schedule maker and a task manager. As progress was made for these two features, a problem was constantly reappearing. This problem was flow. The tool had an acceptable amount of features, however, it did not have an algorithm at which the user could follow. Furthermore, the course teaching assistant also pointed out issues regarding user-friendly navigation. To change this, team members proposed the idea of creating a sheet strictly for data entry. This data could then be applied to other sheets. This would ultimately create a user-friendly environment where a user can introduce information at one location in oppose to in several user forms. This improved the overall organization, a factor which significantly decides a tool's effectiveness.

Team 14 had just as many issue with the back-end of the tool as they did with the tool's front-end. With VBA being a relatively new skill for all team members, the group could not depend on one team member to complete all the work related to VBA. The team was instead comprised of two to three group members. The team utilized a variety of online sources in order to learn, process, and input the correct VBA code into the decision-making tool. All of team 14's VBA citations will be in the works cited section below.

Final Product

Final Design Components

The final tool consists of three main components. These components will be gone into detail in the following section.

1. **Communications**

The communications sheet is data entry tool where users can fill out a form regarding a team member's name, contact information, and availability. Information from this sheet is connected to the scheduling sheet, where a schedule will be created based on the team's availability.

Data Entry Table

Name	Phone #	Email	Morning	Afternoon	Evening	Night
Indusha	905 921 1111	im2semba@uwaterloo.ca	Friday	Tuesday	Tuesday	Thursday
Bhoomika	905 677 1111	bsood@edu.uwaterloo.ca	Wednesday	Friday	Monday	Friday
Bill	905 977 1234	billS@edu.uwaterloo.ca	Saturday	Friday	Friday	Tuesday
Nimisha	905 342 1112	nimishaS@edu.uwaterloo.ca	Thursday	Tuesday	Saturday	Thursday
Bob	905 657 9078	v@edu.uwaterloo.ca	Tuesday	Friday	Friday	Tuesday

2. Task Manager

The task manager acts also as a method to increase group communication. It allows users to keep track of completed/ongoing tasks. There is a master table where team members can input a task and assign it to a specific group member created in the communications tab. Start date, end date, and progress may also be tracked.

Master Table

	Task	Task Description	Start Date	End Date	Assigned Member	Progress
Task Inputer	Organizing	create a process plan and strategies to make sure the group is as efffective as possible	##########	##########	Indusha	Pending
	ANALYZING	in depth analysis of the content	Friday, November 3, 2017	##########	Bill	Pending
Erase row	rubric	creating an assessment to aid us in grading other projects	Saturday, November 4, 2017	##########	Bhoomika	Pending
	Presenation	Created a powerpoint presentation explaning the tool created	Monday, November 6, 2017	##########	Indusha	Pending
	Project report	consisting of the body and executive summary	##########	##########	Bob	Pending
	resource management	using different resources available to organize the project	Sunday, November 12, 2017	##########	Nimisha	Pending

Welcome to task manager.

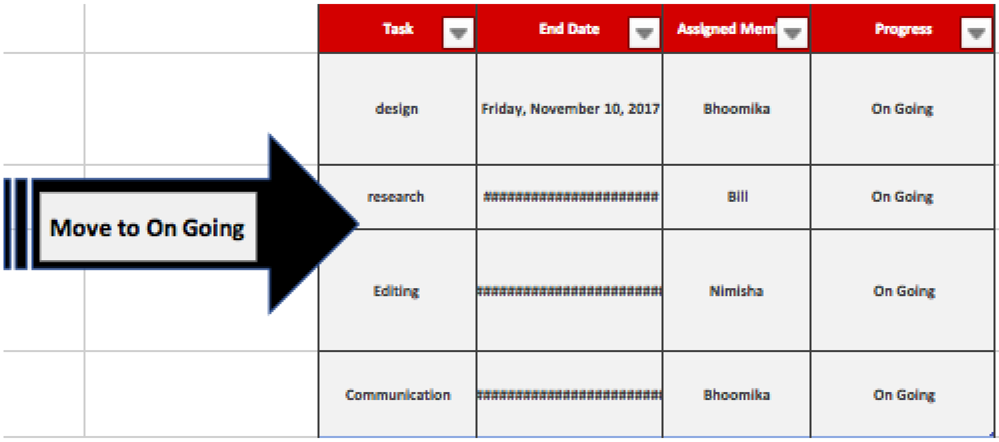
The **task inputer** button allows you to add any task you are planning to work on.

Select any row in this sheet and click **erase row** to delete it, at any time if needed.

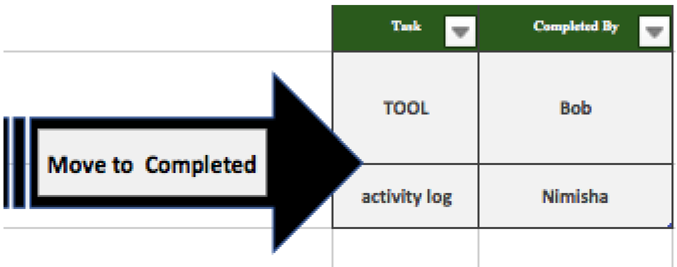
Use the **move** buttons to move

Depending on the status of the team member's task, they may move the task accordingly. Options include the "Completed" and "Ongoing" tables.

Completed and Ongoing Task Sheets



Task	End Date	Assigned Mem	Progress
design	Friday, November 10, 2017	Bhoomika	On Going
research	########################	Bill	On Going
Editing	########################	Nimisha	On Going
Communication	########################	Bhoomika	On Going

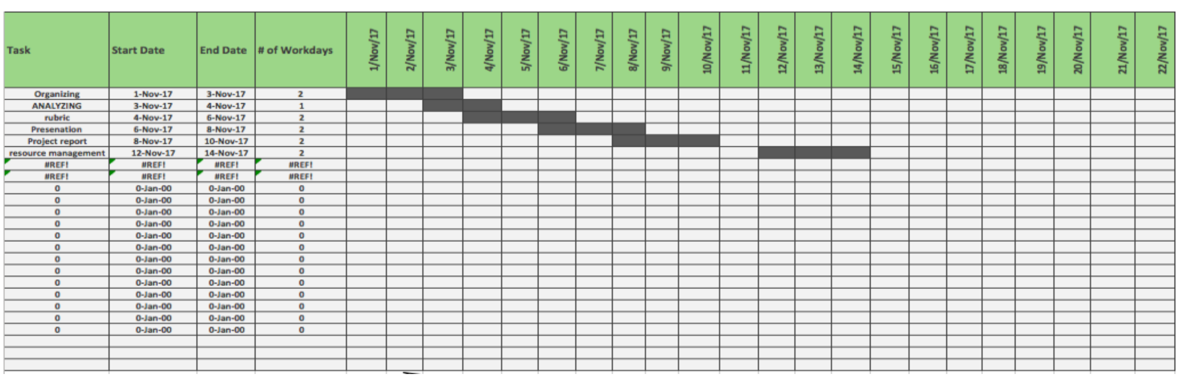


Task	Completed By
TOOL	Bob
activity log	Nimisha

3. Scheduling

The scheduling sheet utilizes "Gantt Charts" to assemble an organized schedule for the team. Data regarding team member availability collected from the "communications" sheet is gathered and arranged into the "Gantt Chart". Individuals can also input start/end dates based on the project deadlines. The "Gantt Chart" is easy to read and efficiently creates a coordinated chart for which all team individuals are able to follow.

Gantt Chart



Task	Start Date	End Date	# of Workdays
Organizing	1-Nov-17	3-Nov-17	2
ANALYZING	3-Nov-17	4-Nov-17	1
rubric	4-Nov-17	6-Nov-17	2
Presenation	6-Nov-17	8-Nov-17	2
Project report	8-Nov-17	10-Nov-17	2
resource management	12-Nov-17	14-Nov-17	2
#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0
0	0-Jan-00	0-Jan-00	0

Appendix A		
Milestone	Brief Description	Due Date

Number		
1	Three to five page problem analysis document describing the purpose and the function of the decision-support tool. Project plan must also be included.	September 26, 2017 9 AM
2	Five to ten page description/analysis of two possible designs. Teams must critique each design and have a rationale for chosen tool.	October 12, 2017 9 AM
3	First prototype of the tool.	November 7, 2017 9 AM
4a	Project report, project/activity log, PowerPoint presentation deck, rubric for fourth milestone deliverables, and final tool.	November 16, 2017 10 AM
4b	An assessment of another team's project.	November 23, 2017 9 AM
5	Presentations alongside a short note as to what groups would do differently given the chance.	November 30, 2017 9 AM

Appendix B			
Group	Belbin's	Description	Tasks

Member	Role		
Indusha Semba	Plant	Highly creative individual who comes up with good ideas and solves key issues (Belbin, 2011).	- VBA - Creates Ideas - Solves team issues
Bill Sheng	Co-ordinator	Draw out team members, divides out work, and organizes process of project (Belbin, 2011).	- Project Plans - Written Work
Nimisha Saxena	Specialist	Brings in in-depth knowledge/technical skills to the team (Belbin, 2011).	- VBA - Streamline team process
Bhoomika Sood	Completer Finisher	Used at the end of tasks polish and scrutinize the work for errors (Belbin, 2011).	- Editor for VBA - Editor for written work - Editor for all other aspects

Appendix C	
Team Constitution	● Group members must complete all work before the given deadline. ● Group members must attend all group meetings, otherwise risk getting a zero. ● Group members must treat each other with respect and be willing to compromise. ● Group members must put 100% effort into their work (Grammar errors/weak points are not tolerated)

Appendix D

Milestone	Task	Contributor
1	**3-5 Project Analysis/Project Plan** Analysis - Formatting -	All group members

		Nimisha
2	**5-10 Page Document on Prototypes and Rationale for your choice** Prototype Design - Document - Rationale - Document Formatting -	 All group members Bill and Nimisha Indusha and Bhoomika Nimisha
3	**First Project Prototype** Design - VBA - Front-end development -	 Bill and Nimisha Indusha and Bhoomika and Bill Bhoomika
4	**Project Report/Project Log/Activity Tracking Report/Final Tool/Rubric/Powerpoint** Powerpoint - Rubric - Activity Tracking Report - Project Report - Project Log - Final Tool VBA/Front-end/research -	 Nimisha Bhoomika Bill Bill and Bhoomika Bill Indusha and Nimisha

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Belbin, D. (2017). *The nine Belbin Team Roles*. [online] Belbin.com. Available at: http://www.belbin.com/about/belbin-team-roles/ [Accessed 11 Nov. 2017].

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