

Evaluation of Get Up and Move Orientation Course

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Introduction

This report examines results from a pre/post-test evaluation of the Get Up and Move (GUM): Orientation Course (Appendix A), an interactive multimedia lesson created in H5P. This orientation course is designed to introduce people to evidence-based information about the dangers of sitting too much throughout the day, provide some simple solutions, and introduce them to the GUM website and app. In the future, the goal of this orientation course will be to recruit new users to the GUM program and mobile application. However, because the app and website are still under development, the goal of this evaluation was to directly measure learning outcomes.

Methodology

Prototype

The GUM Orientation Course is a 20-minute lesson that includes text, audio, video, and images to present information. Additionally, various interactive items are included to engage participants and reinforce learning. The course is designed to be completed independently so users should be capable of completing the lesson without additional instruction or guidance. The strengths of the instructional program include it being engaging and free from technical errors. It also considers the wide range of users in the target audience and includes additional support for navigation and accessibility. Because this course is a prototype, its most obvious weakness involves some of the videos that have been included, which will need to be remade in the future. For example, most of the GUM videos have problems with uneven audio volumes. A final weakness to be considered is that while the instructional topic is relevant to all users, some

people resist learning that encourages lifestyle changes, creating a barrier that could interfere with learning outcomes in some cases.

Learners

The target audience for this evaluation was broad. Different email templates (Appendix B) were used to invite approximately 200 people to participate. Ultimately, 41 people started the program and 36 completed all three stages. With the exception of the twelve year old son of one of the evaluators, all test subjects were adults from diverse age ranges, levels of education, abilities, and cultural backgrounds. Most participants had little prior knowledge of the program, and there were no prerequisite skills required; only a readiness to participate to the best of their abilities and complete the process.

Process

The evaluation process included three items completed in order by each participant: Google Form pre-test (Appendix C), GUM Orientation Course, and Google Form post-test (Appendix D). After agreeing to participate, subjects were provided with instructions including a link to the ten item pre-test. This Google Form automatically provided users with the link to the orientation course once their answers had been submitted. The post-test was accessed by a link at the end of the orientation course. The post-test included the same ten items as the pre-test, in addition to a reaction questionnaire. The results of the pre and post-tests were analyzed using Excel. Some pre-test scores were eliminated in the analysis process if the subject did not also have a post-test score, resulting in paired pre/post-test data for a total of 36 subjects.

Initially, after selecting the GUM Orientation Course for evaluation, the team created all necessary instruments. The ten pre/post test items were created first and were written to assess

the learning goals outlined in the orientation course. These ten test items provided balanced coverage of learners' ability to identify:

- a sedentary lifestyle or workplace.
- the minimum amount of physical activity recommended by the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO).
- the dangers of physical inactivity.
- costs to themselves and others of sitting too much.
- key strategies to help them prevent the dangers of sedentary behavior.
- the principles and benefits of the Get Up and Move (GUM) program.

The evaluation team made an effort to write multiple items that would assess learners beyond basic recall of the facts and information presented in the lesson. As a result, many of the item types were multiple select or choice matrix. This meant the team needed to create an intentional scoring system for each item, as shown in Table 1. First, each item was considered for its level of complexity and difficulty and assigned a score weight of one, two, or three. Due to the nature of one of the matrix items that could earn no less than five points in Google Forms, five points was chosen as the baseline score for all items.

Table 1

Difficulty Level and Points Awarded Per Item in Pre/Post Tests

Item #	Weight	Points	Item #	Weight	Points
1	x3	15	6	x3	15
2	x1	5	7	x2	10
3	x1	5	8	x3	15
4	x1	5	9	x1	5
5	x2	10	10	x2	10

This scoring system was integrated into the Google Form pre and post tests. However, Google Form's limited scoring abilities meant that subjects would be assigned points using an all or nothing strategy. The team felt it would be more appropriate in this case to assign partial credit for each item and designed a procedure to be done in Google Sheets manually after all data was collected and exported. First, the raw score for each item was determined. One point was awarded for each correct answer selected while one point was subtracted for each incorrect answer selected. A minimum score of zero was enforced, so no participants earned negative points for any item. Second, these raw points were converted mathematically based on the number of points the item was worth. Finally, adjusted item points were added together to determine the overall score earned by each individual participant.

Tryout Conditions

All standard participants received their participation instructions through an email and completed the lesson components at their own convenience on their own devices. This is similar to the expected conditions of future users of the GUM program. Non-standard participants included nine subjects who participated in a usability test. As shown in Table 2, the conditions for each test were different, but all sessions were evaluated using the same observation sheet (Appendix E). Those subjects who completed the usability test were encouraged to think out loud as they worked through the items. Virtual usability tests were conducted using a Google Meet or a Zoom call where subjects shared their screen for the duration of the process. These sessions were recorded whenever possible to provide a record and allow further review by all members of the evaluation team. Some in-person subjects also logged into Zoom or Google Meet and shared their screen for the purpose of obtaining a recording.

Table 2*Usability Test: Subject Information, Conditions, and Evaluator*

Subject #	Age Range	Occupation	Conditions	Evaluator
1	19 - 40	Instructional Technologist	Virtual - recorded Google Meet	Lisa Lark
2	61+	Psychologist	In-Person - recorded Google Meet	Lisa Lark
3	19 - 40	High School Teacher	Virtual - recorded Google Meet	Lisa Lark
4	61+	Professor and Entrepreneur	Virtual - unrecorded Zoom	Mark Angel
5	61+	Shop Owner	Virtual - unrecorded Zoom	Mark Angel
6	< 18	Student	In-person - unrecorded	Mark Angel
7	61+	Retired	In-person - recorded Zoom	Maricel Manglicmot
8	61+	Supervisor	In-person - recorded Zoom	Maricel Manglicmot
9	19-40	Firmware Engineer	In-person - recorded Zoom	Maricel Manglicmot

Results

Overall participant scores on the pre and post tests are summarized in Appendix F. Most subjects improved on their initial score after completing the lesson, as also seen in the histogram (Figure 1). Additionally, the mean pre-test score was 50.83 while the post-test mean was 60.76. Overall statistical analysis results are shown in Figure 2. A directional t-test confirmed the statistical significance of this improvement with a p-value of 0.0000678. Based on this result, the

team also calculated the Cohen's d value using a pooled standard deviation. With a Cohen's d value of 0.855, the results were also shown to be practically significant.

Figure 1

Histogram Comparing Pre-test and Post-test Scores

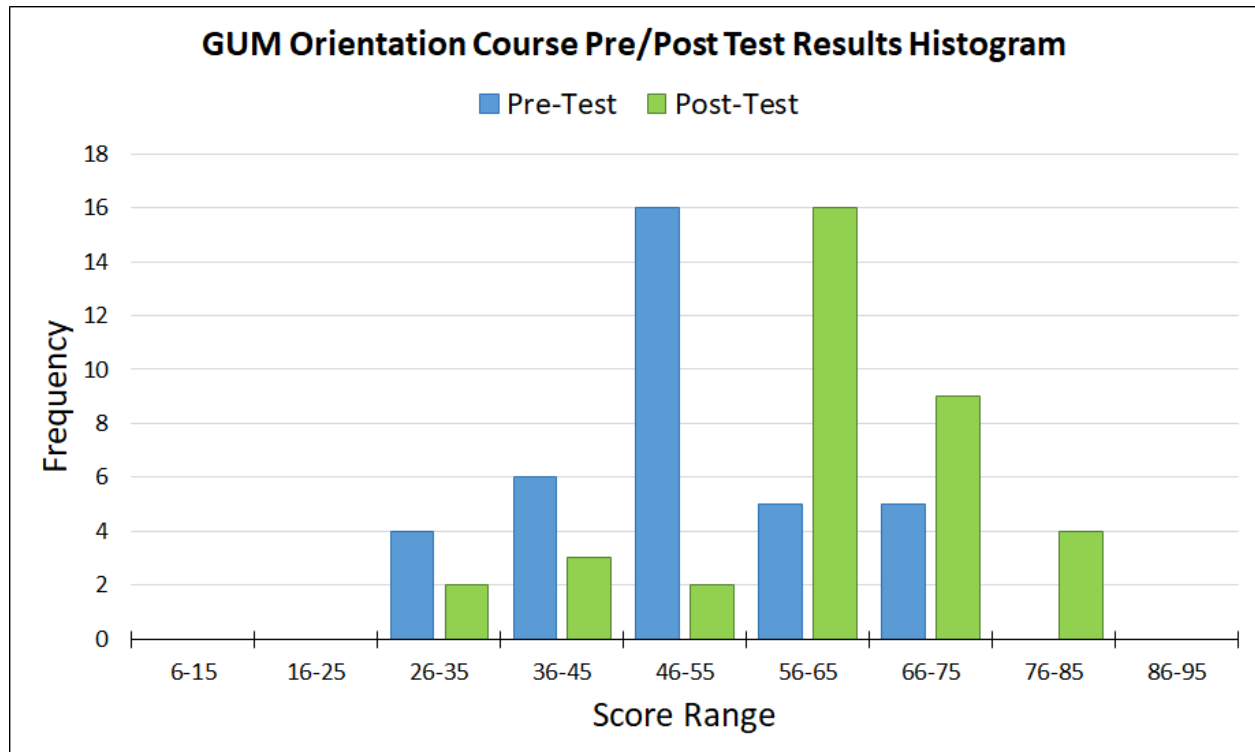


Figure 2

T-test Results and Cohen's d Calculations

t-Test: Paired Two Sample for Means

	<i>Pre-test</i>	<i>Post-test</i>
Mean	50.83333333	60.76027778
Variance	115.8371829	153.7610256
Observations	36	36
Pearson Correlation	0.422189249	
Hypothesized Mean Difference	0	
df	35	
t Stat	-4.754924437	
P(T<=t) one-tail	1.67801E-05	
t Critical one-tail	1.689572458	
P(T<=t) two-tail	3.35603E-05	
t Critical two-tail	2.030107928	

Cohen's d Calculations

Mean Difference:	9.926944444
Average of Variances:	134.7991042
Pooled Standard Deviation:	11.61030164
Cohen's d:	0.85501176

Item Analysis

In order to better understand the overall results, the evaluation team also looked at each individual item. First, raw scores were converted into percentages and averaged for each item. The difference between the post-test and the pre-test averages for each item was calculated (Figure 3). These results demonstrate that while some items showed significant improvement, others did not. For example, items three and six both showed a significant improvement from the pre-test to the post-test while items seven and ten each showed the average score dropping by less than two percent. Table 4 summarizes additional t-tests that were completed for each item to determine which results were significant. All items except for three, four, five, and six were shown to not have statistical significance. Cohen's d values were also calculated for the items that were statistically significant.

Figure 3

Change from Pre-test to Post-test of Average Score for Each Item

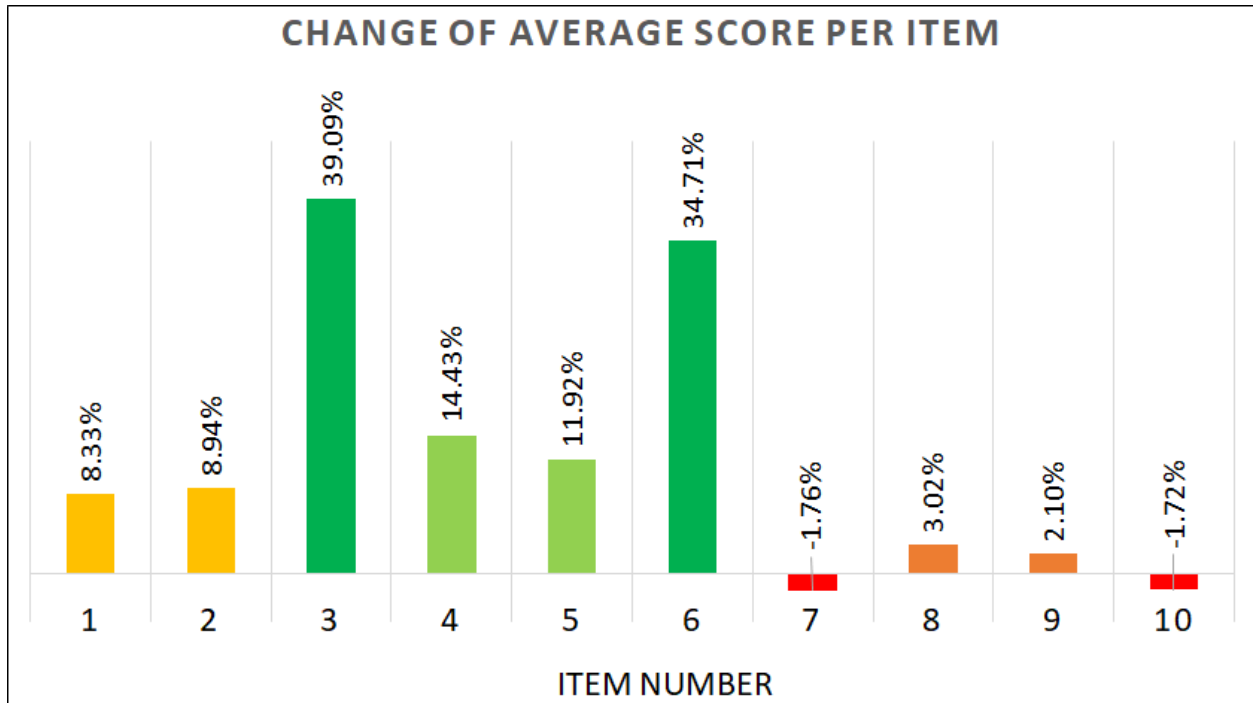


Table 4

T-test and Cohen's d Calculations for each pre/post test item

Item #	P-value (one-tail)	Cohen's d	Item #	P-value (one-tail)	Cohen's d
1	0.162087171	--	6	4.9796E-07	1.225474538
2	0.100462193	--	7	0.298552031	--
3	0.000210806	0.857750392	8	0.162087171	--
4	0.047995868	0.276682003	9	0.5	--
5	0.005752628	0.561630647	10	0.415388402	--

Questionnaire

Results from the post-test questionnaire are summarized in Table 5 with additional graphs provided in Appendix G. Overall, feedback was positive and most people agreed or strongly agreed with each statement. The questionnaire also asked two constructed response questions:

- What was something you liked about the course?

- What was something you would change?

In their answers to the first question, participants often described the multimodal nature of the course and the variety it provided on each slide as increasing their engagement and interest in the course. Many participants also liked the simple, everyday activities that were provided as solutions to help them move more in their own lives. Other common feedback showed that the course was relevant, well-paced, and provided important statistics without being heavy handed.

When it came to dislikes, the most common complaint was that some of the post-test questions were not explicitly covered within the course. The second most common feedback related to problems with inconsistent audio in some of the videos. Feedback from participants that experienced navigation or technical issues was specific to certain slides, but will help the course designer to improve the navigation experience overall. Finally, some participants felt that the topic was straight-forward enough to be presented in a simpler and shorter way.

Table 5

Reaction Questionnaire Data

Prompt	Strongly Agree	Agree	Disagree	Strongly Disagree
The course had an appealing design.	14	18	4	0
I understood how to navigate through the presentation.	21	12	3	0
The audio narration was an effective teaching tool.	24	10	2	0
The information in this course was presented clearly.	28	7	1	0
The pace of this course was appropriate.	24	10	2	0
The material was presented in an interesting way.	22	13	1	0
The material was relevant to my job.	17	11	6	2
This course changed the way I think about how much time I spend sitting.	19	11	6	0

I will change my behavior as a result of taking this course.	15	15	5	1
I would recommend this program to someone I know.	22	12	2	0

Usability Tests

The nine subjects who participated in a usability test provided a representative sample of the target audiences. For those users within the 61+ group, we consistently observed significant issues with navigation. For example, multiple users were observed having trouble moving from slide to slide and struggling to play the videos. The interactive activities were also difficult for this age group despite the navigation video at the beginning explaining how to complete drag and drop items.

All users appreciated the overall message of the program, while some felt the course was too long. Most participants consistently wanted more information about the GUM program itself and more videos of Mark introducing various movements.

Entry conditions

Participants were expected to have fundamental computer knowledge that would allow them to problem solve and pick up new navigation controls quickly. Upon observation, subjects 61 years of age and older had difficulty navigating the course. Some did not know the concept of a play button and had problems playing videos and controlling audio. Drag and drop activities were also a challenge for this age group despite the how-to tutorial within the navigation video on Slide 2.

Participants were expected to have high English proficiency, however, some English learners struggled with understanding American colloquialisms and some vocabulary terms, such as the word “non-communicable” and “sedentary.” Additionally, participants were expected to

have little or no knowledge of the GUM program before taking the pre-test. Even without knowledge of GUM, participants were able to guess correctly on the items intended to assess their learning on this goal. For example, 35 out of 36 participants got question nine correct on the pre-test.

Instruction

It was expected that the entire evaluation process would take participants between 25 and 30 minutes to complete including pre/post-test portions. However, multiple subjects were observed taking much longer. This was specifically observed with participants that experienced navigation issues that slowed them down. Additionally, many subjects from the usability test were observed taking a very long time with the pre-test, even though they were expected to take between two or three minutes.

Another case of observed instruction varying from expected instruction involved the content on Slide 17 and the accompanying knowledge check on Slide 18. Observed participants demonstrated confusion trying to differentiate accurately between exercise and activity. Additionally, the knowledge check did not provide feedback, allowing misconceptions to continue.

Outcomes

Although there were many constructive criticisms of the course, there was a generally positive response. As expected, subjects overwhelmingly demonstrated that the course introduced them to novel and vital information about how sedentary behavior affects their health. Furthermore, many also expressed that they obtained life changing value from participating in the program. This positive outcome was evidenced in the qualitative information gained from the questionnaire and usability tests. This showed more decisive positive results than the data from

the quantitative pre/post-test data, which did not show as large an improvement overall as expected.

One participant pointed out that there may be liability issues from recommending that people use a bathroom further from their desk just to get in a bit more activity during the day.

Recommendations

Many subjects found the navigation to be confusing even with the video tutorial. One way to strengthen accessibility for all learners is to incorporate a “next” and “back” button directly on the screen instead of just using the standard navigation underneath the module. Also, including audio that explicitly directs learners to move to the next slide can remove confusion as to when and how to move forward.

The interactive activities also proved confusing to some people. The demonstration in the navigation video was insufficient as were the simple audio instructions to “drag and drop” items on the screen. To remedy this, explicitly written instructions specific to each activity should be added directly to the corresponding slides.

Because of challenges observed during two usability tests, additional accessibility improvements are needed to better support English Language Learners. For example, the course could clearly define “sedentary” and other key terms on slides where they are first introduced. Should the learner need clarification on other terms, a dialogue box could be designed to pop up showing the definition when a mouse hovers over the word. Avoiding colloquialism can also minimize obfuscation for English learners.

Results from the pre and post tests identified a knowledge gap that can be filled by restructuring course content. Problems with item eight showed that participants remained unclear about strategies to increase activity. This and other content can be better supported by adding

more direct instruction such as a graphic showing various activities like those in the question and their relative effectiveness at breaking up sedentary behavior.

Finally, some subjects mentioned that they would have preferred a simpler and shorter lesson to convey the same information. Creating a new 5-10 minute instructional video to cover the same content in various ways could be effective. Not only would this be easier to navigate for older participants, but it would also allow GUM's creator, Mark Angel, to leverage his expertise and passion. Some participants commented that their favorite parts of the lesson were Mark's custom videos. They appreciated the personalization and wanted more information about the GUM program to be included in the lesson. One participant also emphasized the ease with which people can share videos online with their friends, allowing the Get Up and Move message to reach more people.

Summary

The goal of the GUM program is to transform the way participants perceive their own habitual sedentary behavior and how it affects their lives. Analysis of the pre and post test data showed that significant learning took place with respect to key target objectives as a result of taking the course. Confidence in the data was bolstered by the strong turnout of participants with 36 completing the entire process. Challenges with navigation in general made it difficult and time consuming for some participants to complete the process, especially those in the oldest age group.

Subjective accounts from the questionnaire and participants' additional self-reporting showed overwhelmingly that subjects responded positively to the program and found it helpful and edifying. Even without prompting, some participants were inspired to get up and move during the course itself. Participants tended to express enjoyment and engagement throughout the

program, saying that the multi-modal presentation held their attention and conveyed valuable information, although some felt it could have been done in a more direct and concise way.

Finally, several participants stated outright that they were going to change their sedentary ways as a direct result of taking this course.

Appendix A

Get Up and Move (GUM) Orientation Course Link: https://itcdland.csumb.edu/~lilark/h5p-player/apps/GUM_intro_lesson.html

Appendix B

Initial Solicitation of Subjects:

Dear Friends and (Neighbors/Colleagues):

I am working towards a Masters Degree in Instructional Science and Technology (MIST) at California State University, Monterey Bay. My team of three master's students needs data from a minimum of 20 subjects who will test a short instructional program and provide feedback on their experience. This program is part of the requirements for a summer course focused on instructional evaluation.

First, we will be asking participants to take a pre-test, and then complete a short informational course called Get Up and Move (GUM). Finally, participants will take a post-test and give feedback on their experience. Allow 25-30 minutes to complete this process.

Thank you for considering participation in the evaluation of the GUM health and wellness program. Developed by team member Mark Angel for his Capstone project, GUM is aimed at getting people to stand and move more throughout the day. Your feedback at this time will provide all team members with valuable experience that will be applied to their own Capstone projects this fall.

If you are available to participate in this study, please click this link and begin the Pre-test. All data must be collected by July 19th so prompt replies are appreciated. Feel free to pass this along to others you think will benefit from this program and may be interested and available.

Sincerely,

Email to Data Subjects Who Responded:

Hi [NAME],

Thank you for agreeing to help us test the efficacy of our Get Up and Move Orientation Course.

Please allow 25-30 minutes to complete steps 1-3 below.

1. Follow this link to complete the Pre-test.
2. You will be provided with the course link at the end of the Pre-test.
3. The Post-test link will be provided at the end of the course.

If you have any questions or problems while attempting to complete this process, please contact me and I will help you resolve the issue as soon as possible.

Sincerely,

Appendix C

The following Google Form includes a copy of the pre-test used. All restrictions have been removed to allow reviewers full access. The version used in the evaluation collected e-mail addresses and required participants to answer all questions before moving on. In order to see the final message and the link provided, click the submit button at the end.

<https://forms.gle/VpaJeNgmJhf26uDC7>

Appendix D

The following Google Form includes a copy of the post-test used. All restrictions have been removed to allow reviewers full access. The version used in the evaluation collected e-mail addresses and required participants to answer all questions before moving on. In order to see the final message and the link provided, click the submit button at the end.

<https://forms.gle/1sr243rMxnYBxRJ38>

Appendix E

Observation Sheet (Front):

Tester's Name:

Participant Information:	YES	NO	Name:	Occupation:
			Age: <input type="checkbox"/> <18 <input type="checkbox"/> 19-40 <input type="checkbox"/> 41-60 <input type="checkbox"/> 61+	
Did the user listen to all audio all the way through?			<input type="checkbox"/> User jumped around a lot <input type="checkbox"/> Used transcript multiple times	
Did the user complete all interactive elements?				
Did the user encounter any problems? (technical, navigation, understanding instructions, etc.)			<input type="checkbox"/> User resolved problem on their own <input type="checkbox"/> User needed intervention to solve	
Does the user navigate the course intuitively?				
Pre / Post Test Notes:				

Observation Sheet (Back):

Environmental Conditions during test:

Interview/Debrief Questions:

1. Ask for elaboration on any problems noted above.
2. What were your general impressions of the course?
3. Do you have any questions for me about the course, the program, or this process?

Other Notes:

Script for Usability Test:

Hi (Name),

Thank you for agreeing to help us test the efficacy and usability of our Get Up and Move Orientation Course.

I am going to be observing you as you go through this process. As you go through this process, please “think out loud” as you go through all aspects of the program. If you think something is weird, silly, confusing, annoying, distracting, you don’t know what to do or where to click etc., say it out loud. It will not offend me; the goal today is to improve our course and this is just our first draft.

I will also be recording this session to make sure I capture all issues that come up and share these issues with my team. Please allow 25-30 minutes to complete steps 1-3 below.

- Follow this link to complete the Pre-test.
- You will be provided with the course link at the end of the Pre-test.
- The Post-test link will be provided at the end of the course.

Appendix F

GUM Orientation Course: Pre-test and Post-test Results

Subject #	Pre-Test	Post-Test	Delta	Subject #	Pre-Test	Post-Test	Delta
1	55.17	57.17	2.00	19	52.17	39.67	-12.50
2	58.83	76.67	17.84	20	49.83	66.5	16.67
3	45.17	57.17	12.00	21	54.83	68	13.17
4	52.17	62.17	10.00	22	49.83	69	19.17
5	54	60.17	6.17	23	28.5	73.17	44.67
6	62.33	56.83	-5.50	24	53.83	69.67	15.84
7	66.67	69.67	3.00	25	44.67	68	23.33
8	52.17	72.67	20.50	26	45.83	58.33	12.50
9	39.5	61.83	22.33	27	43.17	73	29.83
10	52.33	79.67	27.34	28	54.17	55.5	1.33
11	65.67	76.5	10.83	29	45	61.83	16.83
12	49.83	61.5	11.67	30	65.17	59.17	-6.00
13	26.5	48.17	21.67	31	48.5	60.5	12.00
14	54.17	58	3.83	32	36.33	42.5	6.17
15	34.33	34.33	0.00	33	70.17	83	12.83
16	61.5	64.17	2.67	34	34.33	38	3.67
17	51.33	31.67	-19.66	35	63	57.17	-5.83
18	66	64.67	-1.33	36	43	51.33	8.33

Appendix G

Questionnaire Results:

