

The data

The dataset being analyzed includes responses from 129 participants who were asked a round of both multiple-choice and open-ended questions. As indicated by the Tables below, male respondents make up 67.4 percent of the total dataset, with 97.7 percent indicating that computer science is their chosen field of study. With Master students, lecturers and participants with diplomas making up only 14.7 percent of the total, the rest were undergraduate students.

From these results it becomes clear that the majority of respondents were male, computer science undergraduate majors. This reality has both positive and negative implications. As a whole, analyzing such a group means that the inferences can be kept narrowly defined. Given the small size of the dataset, this makes it easier to infer results. On the negative side, the system would benefit from an analysis of a broader range of individuals as a way of ensuring usability for the population at large. This may be something to consider for further research and investigation.

Additionally, results from the qualitative element of the survey, Question 6 and Question 7, indicate that for further testing and analysis, the location of the testing area will be of vital importance. Specifically, the testing was conducted in a computer laboratory on campus. Many if not all of these machines did not offer sound capabilities, most presumably for lack of need in that environment. The difficulty is that several respondents who test as “auditory” learners were unable to have the advantage of the sound portion of the test. This made their experience far less significant, and may have also somewhat skewed the overall results.

Table 1 – Gender Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	87	67.4	67.4	67.4
	Female	42	32.6	32.6	100.0
	Total	129	100.0	100.0	

Table 2 – Discipline Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer field	126	97.7	97.7	97.7
	Non computer field	3	2.3	2.3	100.0
	Total	129	100.0	100.0	

Table 3 – Status Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undergraduate	110	85.3	85.3	85.3
	Master	4	3.1	3.1	88.4
	Diploma	9	7.0	7.0	95.3
	Lecturer	6	4.7	4.7	100.0
	Total	129	100.0	100.0	

The age variable is also skewed toward the 18-24 age group. A bivariate correlation of the variable Age and Status indicate that the correlation is statistically significant to .01. One of the two variables, therefore, should be eliminated in any regressive analysis, however for this report, no regression is possible based on the data set. First the data set is just barely over 100, making the results very uncertain. Second, the variables do not seem to be exhaustive, so the results from a regression analysis would be unreliable. Instead what is utilized here are detailed descriptive statistics, used to determine any patterns in the data that could indicate the usefulness of this system.

As a result of the correlation analysis below, status will be used exclusively, and age will be eliminated, because the two variables appear to be measuring the same thing, so there would be no advantage to analyzing them separately (the results would be the same).

Table 4 – Correlation between Age & Status Variables

		Age	Status
Age	Pearson Correlation	1	.613(**)
	Sig. (2-tailed)	.	.000
	N	129	129
Status	Pearson Correlation	.613(**)	1
	Sig. (2-tailed)	.000	.
	N	129	129

** Correlation is significant at the 0.01 level (2-tailed).

The Analysis

A summary of the variables used in the following analysis is included in Table 5 below (see Appendix I for a detailed listing of all variables in the dataset).

Table 5 – Summary of Variables

Variable	Type	Description
Group	Pre-designated	1=VARK; 2=Honey; 3=VARK & Honey; 4=None
Answer2	Self defined	Was this lesson more tailored to you? (according to your learning styles?)
Honey	System generated	1=Activist; 2=Reflector; 3=Theorist; 4=Pragmatist
VARK	System generated	1=Visual; 2=Aural; 3=Read/Write;

		4=Kinesthetic
Gender	Demographic	0=Male, 1=Female
Discipline	Demographic	College major or area of expertise
Status	Demographic	1=Undergraduate; 2=Master; 3=Diploma; 4=Lecturer

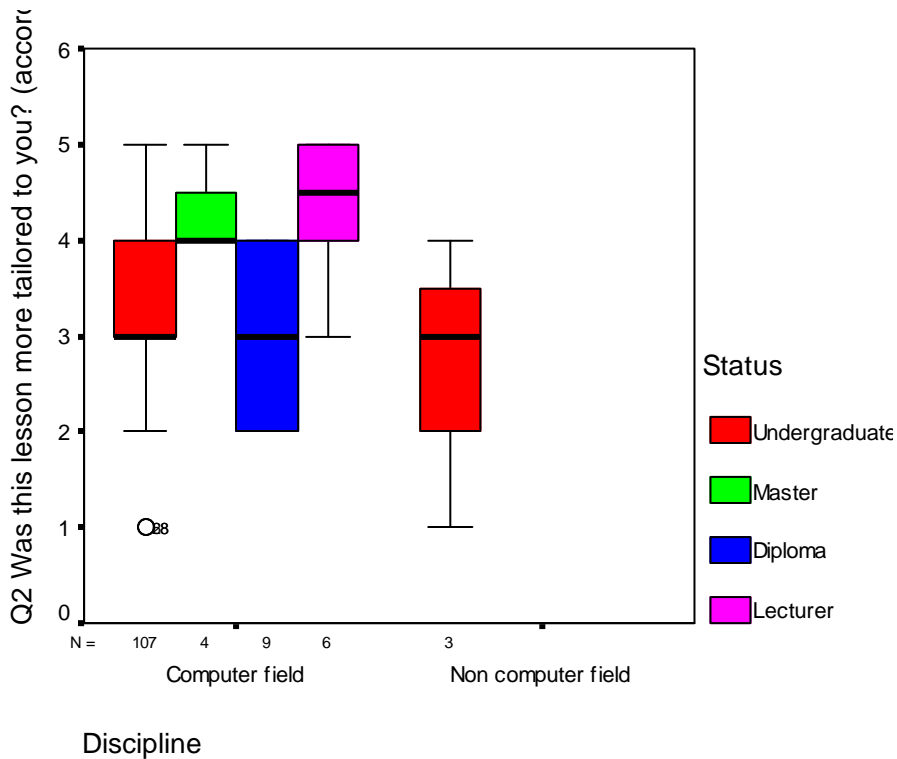
The dependent variable, Group, is the heart of this analysis. This variable indicates whether or not participants were given the system test in consideration of their learning styles. There were two learning styles being considered. First was VARK, based on biological or physical learning considerations, and second, Honey, based on psychological learning considerations (see Table 5 for individual styles for each variable).

Once the participants had responded to learning style questions, the system categorized each participant's style. Each participant was then divided into one of four testing groups.

The first group was given the test based on their VARK learning style only. The second group, on Honey learning style considerations. Group three was tested based on both their Honey and their VARK learning style, with the last quarter of participants given the test with no learning styles considered at all.

It is expected that participants who completed the test with considerations of both their learning styles (Honey and VARK), will more strongly agreed in Question 2 that the test accommodated their learning style. We will begin the analysis by making sure that the demographic data does not have an effect on the results from Question 2. In other words, we want to eliminate the possibility that Question 2 is based on a person's gender, status, or discipline. To do that several boxplots were generated to ensure that these variables did not noticeably effect results from self-described Question 2.

Figure 1 – Clustered Boxplot: Q2 * Discipline * Status



Developed first was a clustered boxplot (Figure 1 above) that analyses the relationships between the responses for Question 2, and a respondent's Status, and Discipline. This chart was chosen as a way of visual interpreting the results from three essential variables – Question 2, Discipline and Status. The boxplot is able to show mean values for the variable Discipline, which are divided by Status, to give a picture of where the majority of the data results fit within the whole set.

The results indicate that most responses have a mean of 3, indicating a neutral response to Question 2. The outliers are from respondents who are either Lecturers or Master degree students. The Question 2 results from these two groups are at 4 and 4.5, indicating that these groups more strongly agree that the test was tailored toward their learning style. It could be that these two groups have a better understanding of what these learning styles are like, therefore why they would agree more strongly. To analysis this assessment we look to the answer to Question 1. Question 1 is a self determined rating of the participant's understanding of learning styles, which reads: How would you rate your knowledge of the concept of Learning Styles before you visit this website? Respondents answered by selecting one of the following options: 1) I know it very well; 2) I heard about it; 3) I never heard about it. If our estimation of Master level students and lecturers is correct, these two groups will have more often responded to this question with a 1, indicating that they know about learning styles very well. Table 6 below analyzes this particular issue with a cross tabulation.

Table 6 – Crosstab: Question 1 * Status

Percentage	Status				Total
	Undergraduate	Master	Diploma	Lecturer	

Q1 How would you rate your knowledge of the concept of Learning Styles before you visit this website?	I know it very well	20.0	50.0	55.6	16.7	23.3
	I heard about it	36.4	50.0	22.2	50.0	36.4
	I never heard about it	43.6	0	22.2	33.3	40.3
Total		100 (N=110)	100 (N=4)	100 (N=9)	100 (N=6)	100 (N=129)

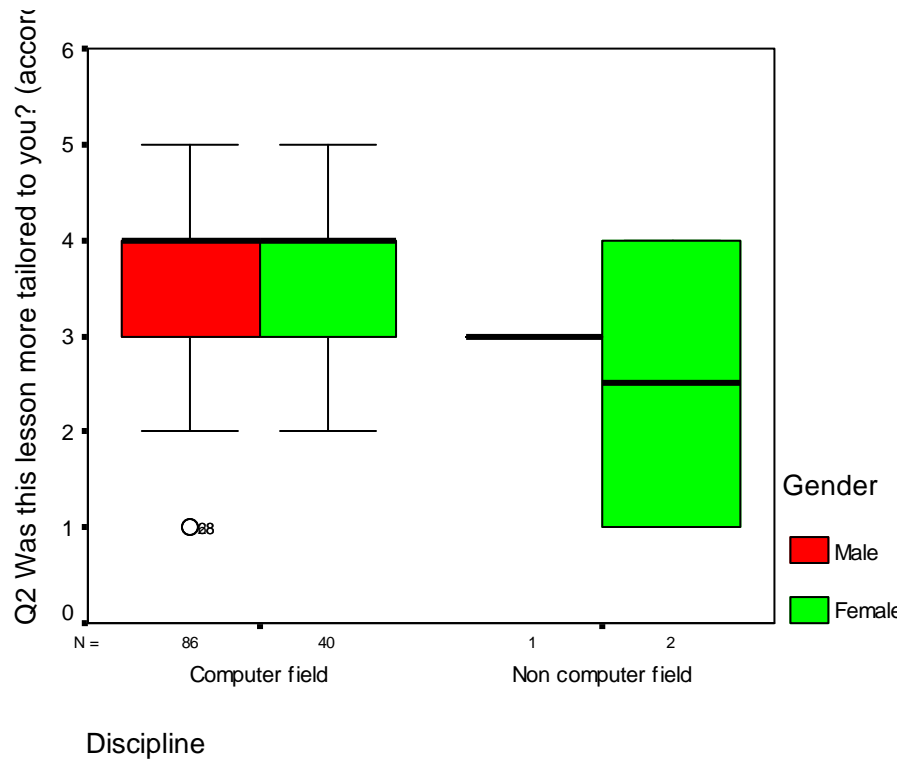
The table above indicates that our assumption was correct. Undergraduates were far less likely to believe they knew a lot about learning styles as indicated; only 20.0% of undergraduates who participated believed they “know [learning styles] very well”. Conversely, for Master students 50.0% believed they knew learning styles very well, and the remaining 50.0% had at least heard about it. For lecturers, only 16.7% felt they knew of it very well, but those who had never heard of it were still fewer than the number of undergraduates who had never heard of it (33.3% versus 43.6%).

The only anomaly seems to be with the Diploma group. Although 55.6% of this group indicated that they knew learning styles very well, this group give an average response to Question 2 as 3, which indicated they were neutral on whether or not the test had accommodated their learning style.

Perhaps this result is due to the fact that this group of students felt they *should* know what learning styles were, but didn’t really understand them. Given that this group was so small (N=9) the results are likely not going to skew any findings from this analysis.

The last demographic variable to analysis is Gender. The boxplot below (Figure 2) replaces Status with Gender. Results indicate that responses were essentially the same no matter what Gender the respondent was.

Figure 2 – Clustered Boxplot: Q2 * Discipline * Gender



Now that we have made certain the demographic data has not affected our results, we can test whether or not a respondent's learning style, which was computer generated as part of the testing, affected a respondent's belief that the test was conducive to their learning style. Figure 3 & 4 below show the results of boxplots analyzing responses to Question 2, and each of the two learning styles.

Figure 3 –Boxplot: Q2 * Learning Style 1

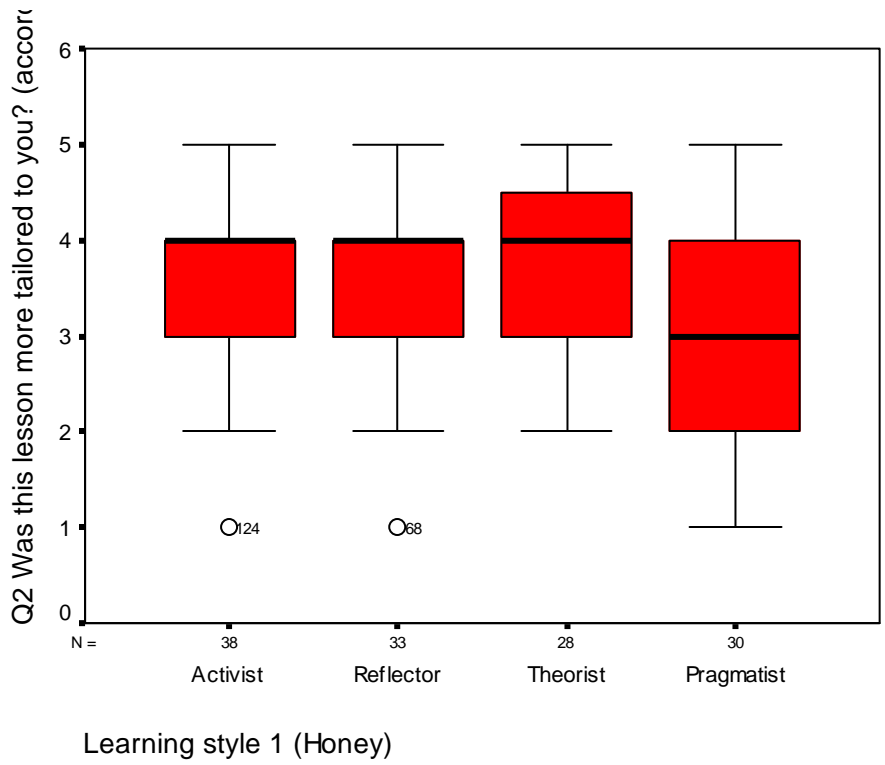
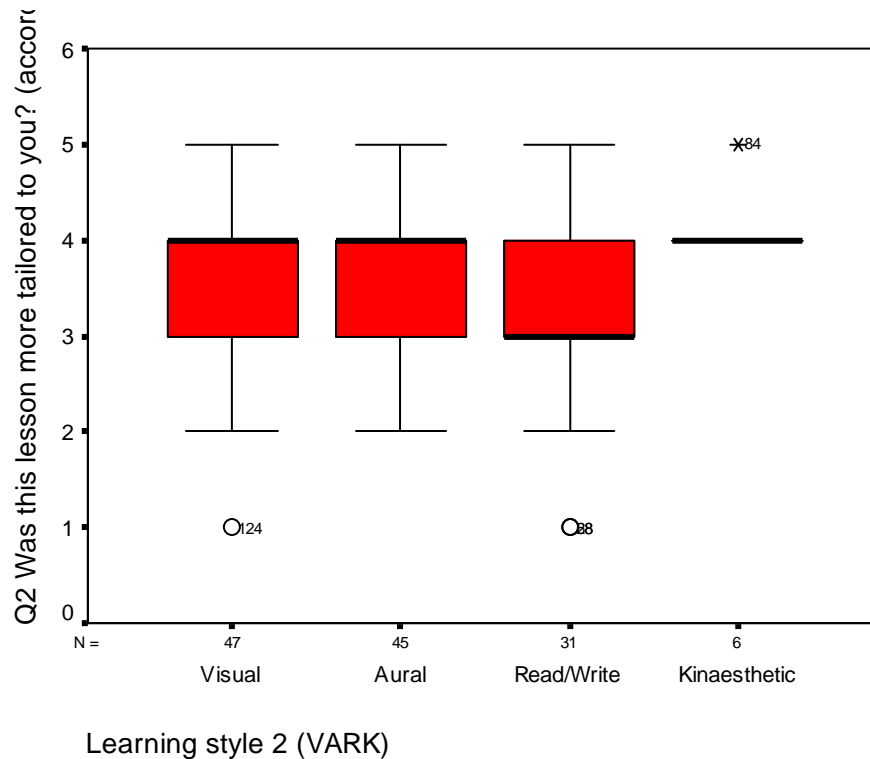


Figure 4 –Boxplot: Q2 * Learning Style 2



Results from Figure 3 & 4 indicate that average responses are equally distributed across learning styles. For both results, the mean response was between 3 and 4, or somewhere in the “neutral” category, and does not appear to be distributed abnormally.

Question 3, 4, and 5 related to functionality issues, as well as, for Question 3, how well the respondent felt they were able to distinguish learning styles. If a respondent did not feel comfortable that they knew if the lesson was presented for their learning style, they would have a difficult time offering a reliable response to Question 2, so we would expect to have very few respondents with a “disagree” or “strongly disagree” response to Question 3.

For Questions 4 and 5, responses are less significant to the overall success of the lesson, and more instructive of the functionality of the site. However, if too many respondents felt the system was difficult to use, then it may have had an effect on responses to Question 2.

The crosstabs below were generated as a way to see if there are any negative patterns as expressed above, that developed from the data.

Table 7 - Q2 Was this lesson more tailored to you? (according to your learning styles?) * Q3 It is easy to distinguish between a lesson that is presented for my learning styles and one that is not suitable for my learning styles

Count	Q3 It is easy to distinguish between a lesson that is presented for my learning styles and one that is not suitable for my learning styles.	Total

		Disagree	Neutral	Agree	Strongly agree	
Q2 Was this lesson more tailored to you? (according to your learning styles?)	Strongly disagree	0	0	1	2	3
	Disagree	1	5	9	3	18
	Neutral	3	13	17	8	41
	Agree	1	16	21	4	42
	Strongly agree	2	7	13	3	25
Total		7	41	61	20	129

Table 7 above shows no unusual patterns from our data. Most respondents either agreed or strongly agreed that they were able to distinguish between learning styles. Those who were neutral (41 respondents total) still felt that the system had been tailored toward their learning style. Of the seven respondents who indicated they were not able to distinguish between learning styles, two strongly agreed that the lesson was tailored to their style, and one disagreed that the lesson was tailored to their style. It is hard to determine how these three individuals could have given more than a neutral response to Questions 2, given they were unable to distinguish the difference between styles, however the very small number (3 out of 129 respondents total) is not a cause for concern.

Table 8 below offers similar results. Only 1 of the 129 respondents felt that the site was not organized in a way that was easy to understand, and they provided a neutral response to Question 2. The majority of respondents (56 of 129 respondents) felt the system was easy to understand, while 36 respondents strongly agreed. Of the 29 neutral responses to Question 4 how easy the system was to understand, half of them still felt that the system provided a lesson that was tailored to their needs (16 of 29 respondents).

Table 8 - Q2 Was this lesson more tailored to you? (according to your learning styles?) * Q4 This site is organized in a way that is easy for me to understand

Count

		Q4 This site is organized in a way that is easy for me to understand.					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Q2 Was this lesson more tailored to you? (according to your learning styles?)	Strongly disagree	0	1	1	0	1	3
	Disagree	0	3	4	9	2	18
	Neutral	1	1	8	21	10	41
	Agree	0	1	12	17	12	42
	Strongly agree	0	1	4	9	11	25
Total		1	7	29	56	36	129

Question 5 is very similar to Question 3, and as would be expected, the results are similar to those from Question 3 (see Table 7 above). Only three respondents felt the site was not easy to use. Despite feeling the site was not easy to use, however, they still felt that it was tailored to their learning style, which means it is possible that if improvements were made to the functionality of the system its value for users may be enhanced as well.

Table 9 - Q2 Was this lesson more tailored to you? (according to your learning styles?) * Q5 This site is easy to use

Count

		Q5 This site is easy to use.				Total
		Disagree	Neutral	Agree	Strongly agree	
Q2 Was this lesson more tailored to you? (according to your learning styles?)	Strongly disagree	0	1	1	1	3
	Disagree	0	4	8	6	18
	Neutral	0	9	18	14	41
	Agree	3	10	14	15	42
	Strongly agree	0	6	9	10	25
Total		3	30	50	46	129

Findings

Now that the variables have been analyzed and determined to be free of potential bias, we can analyze the main question of inquiry; did this computer system successfully administer a lesson that was conducive to the participant’s learning styles. A cross tabulation was generated to analyze this question (Table 7 below). Results from this analysis indicate that in fact, the system appears to be tailoring the lesson to an individual’s learning style.

For those respondents who were included in the “VARK & Honey” group (indicating that the lesson included elements from both learning style approaches) 51.6% strongly agreed that the lesson was tailored to their learning style, while only 3% of those who were included in the “None” group (no learning styles were incorporated into the lesson) believed that the lesson was tailored to their style. Additionally, of the None group, 42.4% disagreed that the lesson was tailored to their style, and 42.4% were neutral.

Table 10 – Cross Tabulation; Group inclusion * Q2

Percent

		Q2 Was this lesson more tailored to you? (according to your learning styles?)					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Group inclusion	VARK	0	0	27.3	54.5	18.2	100 (N=33)
	Honey	0	9.4	40.6	43.8	6.3	100 (N=32)
	VARK & Honey	0	3.2	16.1	29.0	51.6	100 (N=31)
	None	9.1	42.4	42.4	3.0	3.0	100 (N=33)
Total		3	18	41	42	25	100 (N=129)

Summary

The results from each of these analyses, when combined indicate the following:

1. The results do not seem to be biased by any demographic variable in the study, including gender, discipline or status of the respondent
2. Participant learning style (computer generated) does not seem to have biased the respondent's view of whether or not the lesson was tailored to their learning style or not
3. Respondents were more apt to disagree that the lesson was provided based on their learning style if they were not included in the group that did not incorporate learning style into the lesson (the "None" group), and were more apt to agree that the lesson was tailored to their learning style when they were included in any of the remaining groups, especially respondents from group "VARK & Honey", who were administered a lesson based on both of their learning styles.