

A Learning Style and Choice-based Short Project Improves Perceived Course Quality and Content in a Summer Introductory Nutrition Course¹

Tory L Parker²
Brigham Young University
Provo, UT 84602



Abstract

High enrollment university courses (500 or more) limit interaction between students and the instructor, with teaching targeted to the group rather than the individual. Smaller summer class sizes allow for the use of assignments that better target interaction and individuals. To take advantage of this, students enrolled in a summer introductory nutrition course were given a choice among four short projects in addition to the usual course load. Each project was designed to target different learning styles. They included accountability to both the students' peers in the classroom as well as to the instructor. It was hypothesized that the short project would increase motivation in the class and that students would feel the class better applied to their lives. The effect of the short project was evaluated through a qualitative post-semester survey as well as end-of-semester quantitative evaluations. The post-semester survey indicated that quality of the course, motivation, participation, internalizing of the project, thinking about it ahead of time, and value outside the course increased as a result of the short project design and implementation. End-of-semester course ratings suggested the short project contributed to improved attentiveness, development of new viewpoints, interest in the course, course quality and course content over the previous summer when no short project was required. It is recommended that a choice and learning style-based project be incorporated into future courses.

Introduction

A combination of department budget, classroom availability and student interest often results in general education courses that are held in large auditoriums with 500 or more students. While cooperative learning methods such as think, pair, share (Nolinske and Millis, 1999) and other technological enhancements (Kim et al., 2007), where available, can allow for enhanced lectures and improved student learning, even a determined and engaged instructor will only be able to interact directly with a fraction of the students in a semester. Smaller group discussions, group projects and other

potentially useful teaching methods are logistically difficult due to sheer number and available space. Papers or projects that are completed by all students require a large team of teaching assistants to read or grade in a timely manner. Budgets do not always make such possible.

In the Food Science and Human Nutrition (FSHN) department at the University of Illinois, an introductory nutrition course, FSHN 120, fits the scenario described above (750 students per semester in one large class). All of those factors create a disconnect between the instructor and most of the students. While it could be argued that students have many opportunities to interact with the instructor, *vis-à-vis* office hours or personal effort, the course size induces a separation between student and faculty that negatively affects students' perception of course quality (Koth et al., 2008).

The FSHN department offers FSHN 120 during the summer term. The class size cap is significantly smaller (60 students) and has been taught the last few years by advanced graduate students with an interest in teaching who have previous experience as a teaching assistant. Content for the summer course is the same as fall/spring, but the manner in which it is presented can be vastly different in this accelerated, reduced enrollment environment. The department chair allows the graduate student instructor to use any teaching techniques desired. The author taught the course two summers as a graduate student. In the second year, the effect of a unique interactive assignment with a hypothesis driven design was studied.

Two major limitations of the large fall/spring course were a lack of one-on-one professor-student interaction as a natural part of course design and the difficulty of efficiently designing aspects of the course for the personality/strengths of individual students (Holme and Lloyd, 1993). The smaller class size partially helped overcome the first limitation, though providing an opportunity for the instructor to evaluate student projects one-on-one would better address this limitation. The second limitation, targeting student personality/strengths, could be addressed by applying learning styles research and choice to the course. Giving students the opportunity

¹Acknowledgements: I would like to thank Chad Stroud, who provided half of the course instruction and grading during the summer 2007 term, and Faye Dong, department chair of the Food Science and Human Nutrition department at the University of Illinois at Urbana-Champaign for giving me the opportunity to teach as a graduate student.

²Assistant Professor, Nutrition, Dietetics and Food Science, S-135 ESC

to choose, traditionally a rare offering in college courses (Frymier et al., 1996), can increase motivation, empowerment, and creativity (Lewis and Hayward, 2003). Designing projects with learning styles in mind might also decrease choice anxiety, one negative aspect of choice discussed by Lewis and Hayward.

The objectives of this study were to evaluate projects designed from a learning style approach, while also adding choice to improve student motivation and engagement. Students would be given an opportunity to present their material to the class depending on their comfort level (professor only, small group, or whole class) to minimize discomfort while maximizing engagement. Other aspects of the course would remain the same as the fall/spring course. The hypotheses were that student motivation and satisfaction with the overall course would increase, and that students would feel the course better related to their lives outside of class. Previous work (Neuville et al., 2007) suggested this hypothesis would be true.

Methods

FSHN 120 is held during the summer I session at the University of Illinois at Urbana-Champaign. It is four weeks long and met two hours daily. In the summer of 2007, the class was 46% seniors, 27% juniors, 23% sophomores, and 4% freshmen, with 43% male and 57% female. The summer class demographics are somewhat different than during the fall/spring. During the spring 2008 semester, the class was 35% seniors, 33% juniors, 22% sophomores, and 10% freshmen, with 45% male students and 55% female. The composition is skewed slightly toward a lower senior/higher freshman percentage during the regular school semester. The summer registration capped at 63, with 56 completing the course summer 2007, and students came from a variety of disciplines across the campus, as it satisfied a general education elective. The spring semester 2008 class had 718 students enrolled.

Exams and a Nutrition Analysis Project (NAP; students record food consumed over three days and analyze it for caloric and nutritional value) were

required for the summer course just as in the fall/spring course. In addition, students were given a choice among four short projects, each designed to fit learning style types (Table 1). Students could choose from a PowerPoint presentation describing the food they ate in a day, a three-page essay on how some aspect of the course impacted them, an artistic representation of how they viewed and felt about food, or a scientific poster that illustrated or described some aspect of the course. No learning style inventory was given beforehand; students chose based on past experience only. Sign-up sheets were made available the first few days of class for students to select their project.

Table 1. Short Project Titles and Descriptions (as found in the course syllabus) and Associated Learning Styles

Project title	Description	Learning Styles
Select from the following options or propose your own short project for approval. They shouldn't require more than 2-4 hours to prepare to get a good grade, so do not be overly elaborate. We do hope you will enjoy them, if not from a nutritional perspective, then perhaps from the creative viewpoint.		
PowerPoint presentation	Present to the class in a 5 minute PowerPoint presentation one day in your food life. Include a minimum of 10 pictures of the food you ate throughout the day, describe why you chose them, how you might make better choices in the future and barriers to making healthy choices.	VARK ^z auditory and kinesthetic ILS ^y active and visual MTBI ^x extraversion Gregorc ^w Abstract Sequential
Three-page essay	Write a three-page double-spaced essay (spell check or pay dearly) on some aspect of the course that most impacted you, including why and how. Craft it as a story in first-person perspective, being as witty and observant as possible.	VARK read/write ILS reflective and verbal MTBI introversion and thinking Gregorc Concrete Sequential
Artistic representation	Create an artistic representation (Van Gogh and Picasso are too abstract in this case) of how you view and feel about food with captions throughout describing different aspects of the art and why you used them. It must be at least a standard sized poster board in size, which will be exhibited to the class near the end of the course.	VARK visual and kinesthetic ILS intuitive, visual and global MTBI intuition and feeling Gregorc Abstract Random or Abstract Sequential
Scientific poster	Create a scientific poster, medium (standard size poster board) or large (stand size cardboard set-up), that illustrates or describes an aspect of the course. It must introduce the topic, state observations and conclusions and describe where that topic is going in the future. They will be exhibited to the class near the end of the course.	VARK visual and read/write ILS sensing, visual and sequential MTBI thinking Gregorc Concrete Sequential or Abstract Sequential

^zVisual, Aural, Read/write, Kinesthetic Model (Fleming and Mills, 1992);

^yIndex of Learning Styles (Felder and Silverman, 1988);

^xMyers-Briggs Type Indicator (Myers and Myers, 1980);

^wGregorc Mind Styles Model (Gregorc, 1982).

The designing of each assignment according to learning style was based on a study of the learning styles themselves (Fleming and Mills, 1992; Felder and Silverman, 1988; Myers and Myers, 1980; Gregorc, 1982) with application of the concept of linking learning styles to specific assignments (Samples, 1994). Examples described by the original learning style authors and individual questions in the learning styles inventories were also reviewed, and then a project was designed that would best fit a specific learning style in as many of the four inventories as possible. The projects were also designed to require approximately the same amount of time for the students to complete.

A Learning Style

PowerPoint presentations were presented to the class by the student during class near the end of the semester, with comments from students and faculty (department chair and fall/spring instructor were invited to attend). Papers were turned in after an in-class pair/share of paper topics with neighboring students. The instructor then read them and provided comments and scores via e-mail. Artistic representations and scientific posters were displayed around the classroom with the creating student standing alongside similar to a poster session at a conference. Students doing presentations or papers were asked to view each poster and ask questions of the creators one row at a time. The instructor also visited each poster and gave the student time to present their work and respond to questions.

At the end of the semester, a survey (Table 2) was e-mailed to all students in the course asking about the merits of the course in general and the short project specifically. The survey was designed by the author to specifically ask about ways the short project improved the course and for feedback on student perceptions of its effectiveness. Survey response was voluntary, and no incentive was offered other than an e-mail request to complete the survey. Survey responses were compiled by question, and common themes were coded. Representative student quotes were selected for inclusion in the results section below. Formal end-of-semester feedback forms from summer 2006 and summer 2007 were also compared for a quantitative perspective on course improvement. The short project was the only major change in course design between the two summer courses.

Results and Discussion

Eleven students signed up for the PowerPoint presentation, twenty-eight signed up for the three page essay, twelve for the artistic representation and four for the scientific poster. According to the survey responses, students made their choice based on previous experience with that medium, desire for originality, expressivity, or confidence in their skill in that area. Ten survey responses were from female students and seven were from male students, with a total of 17 (30%) out of 56 enrolled. The ratio and

Table 2. Qualitative Survey Questions Administered to Enrolled FSHN 120 Students at the Conclusion of the Summer 2007 Course

General questions about FSHN 120.	
1.	What was your impression of FSHN 120 before taking the class?
2.	Did you talk to anyone who took it or hear anything about FSHN 120 taught during the Fall and Spring? What did you hear?
3.	Did you talk to anyone who took it or hear anything about FSHN 120 taught during the Summer? What did you hear?
4.	What would you consider the most useful aspect of the class to your personal life?
5.	What do you think helped you learn the most in the class—the instructor presentations, the exams, the Nutrition Analysis Project, and/or the short project? Regarding the aspects that helped you the most, why were they effective?
6.	Any other comments or suggestions?
This is the first time short projects have been used in FSHN 120. The following questions are related only to the short project.	
1.	Did you enjoy doing the short project? Do you think it enhanced the quality of the course?
2.	What did you learn from doing the short project?
3.	Have you ever done a short project-type assignment like the one in FSHN 120 in other classes? Which classes? Did you have a choice among several options in those courses as well? What aspects of those short projects did you like?
4.	Did having a choice among several projects increase or decrease your interest in the project or motivation to work on it?
5.	Which of the four options did you choose? Why did you choose it? Are there other options you might suggest we add for future semesters?
6.	How far in advance did you begin thinking about what you would specifically write or present? About how long did you think or discuss with others before beginning the actual work?
7.	What did you think of the format for presenting your projects in class? Did you enjoy seeing/hearing what other students produced? Did the presentations help you learn more about nutrition?
8.	How would you suggest we could improve the short project? How could we improve the way they were presented in class?
9.	Any other comments or suggestions on the short project?

percentage of survey responders to the overall class for choice of project was as follows: PowerPoint presentation: 2/11 or 18%; Three page essay: 8/28 or 29%; Artistic representation: 4/12 or 33%; and Scientific poster: 0/4 or 0%.

The response rate was lower than hoped, though not entirely unexpected. No course credit or extra credit was offered to complete the survey as the survey did not contribute to the learning goals of the course (Padilla-Walker, 2005). By administering the survey after the class had ended to separate the study from the class requirements, the survey responses were more accurately tied to the study rather than other motivating factors, such as a course grade.

General class survey responses

In general among the 17 survey respondents, students had a wide range of opinions of the course, from boring to interesting and easy to hard. Many chose it as an option among many to fill a general education requirement. One student had a unique perspective on summer courses: *"I took it in the summer because when I have previously taken summer courses, they have been much better than the semester ones, because their structure is different and the style is more effective for learning."* This was the goal with this summer class, so it was gratifying to see that one student expected such. Everyone who responded to the survey had heard positive things about the fall/spring class, though none had heard anything about the summer class.

Students really felt the class impacted them personally, from the NAP, to clarifying “*all the information out there,*” to helping understand disease, diets and obesity. One student summarized best why so many students liked the course: “*The whole class was centered around making me better and I completely enjoyed everything.*”

When asked what aspect of the course (the instructor presentations, the exams, the NAP, and/or the short project) most helped the students learn, the NAP was mentioned most, followed closely by instructor presentations, and a few stating the short project. None mentioned exams as contributing to their learning.

General comments about the course: Students appreciated class participation requests by the instructor, visual aids and experiments brought into class, case studies that put course topics into a more complex situation, and a lack of “busywork,” though busywork was not defined. One student suggested that a group project be added.

Short project-specific survey responses

When asked if they enjoyed the short project, all survey responses were positive, with most responding very enthusiastically that it enhanced the quality of the course. The students enjoyed comparing themselves to others and seeing the personalities of other students being expressed in class. They enjoyed putting effort into something they chose, felt they were good at, could project themselves into, and approach the course material from a non-traditional point of view. It increased their understanding of their chosen topic, was unique among other courses they have taken, and/or helped synthesize course material.

When asked what they learned from the project, responses were widely varied. A few stated that nothing new was gained as they simply used information they learned in the course for their short projects, though many comments were very insightful. One student was comforted (“*I really don't eat as badly as I thought I did*”), another was able to clearly see what he/she had learned (“*The change that occurred after taking the course*”), one realized that “*course info could be just as light-hearted as anything else,*” and perhaps most importantly, that “*when you write about something or even do a project on it you spend more time on the subject and get to fully understand it.*” Others (Hand et al., 2002) have explored the value of student writing, confirming this student's impression. Overall, the project was revelatory to nearly all the students that responded to the survey.

Despite the large percentage of juniors and seniors in the class, only two survey respondents had done a short project assignment with a choice aspect in another class, “*although I wish I had,*” reported one student. This suggests the somewhat unique nature and value of a choice-based short project (see

Frymier et al., 1996), at least among survey respondents taking my course. A few others had completed project or presentation assignments, though they did not include a choice component. One who had done a similar project with an element of choice in another class said they enjoyed the flexibility and “*getting to pick what my strengths are so I can show off what I've learned in the best way possible.*”

Choice was important to gaining and maintaining student interest in the short project. It increased motivation, allowing the student to “*truly do what I wanted, and not just crank out what every other student in class was going to do.*” “*Having a choice made all the difference in the world.*” “*I was really looking forward to starting and working on my project, because I was able to choose the type of project that I most enjoyed.*” One student noticed the aim in targeting different learning styles, though it was never mentioned to the class: “*The thing that was really good among the choices was that [they were] able to be adapted by a wide range of people.*” Another pointed out a shortcoming and the reason for adding this project in the summer when class size was smaller: “*It may be a bit difficult for instructors in a large class that may have a high volume of assignments to grade.*”

Most students thought about their project in the first week when it was assigned, though very few started the actual work more than a few days or so before the due date. For some, finding a topic from class they wanted to present or write about caused them to reflect on the project during class, perhaps improving attentiveness and participation, though this was not asked directly in the survey. Many discussed the assignment with classmates, roommates or friends; one mentioned reading his/her paper to a friend before turning it in. This suggests a greater personal interest and engagement with the assignment, with students becoming more fully accountable to themselves and not just the assignment.

The format for sharing the projects gave the most class time to the presenters, with few students choosing to spend significant time viewing the artistic/scientific posters over the choice to leave class early. This disappointed one student who felt she had made a significant effort: “*I felt like I did something interesting and no one cared.*” However, another survey responder said: “*I liked the collages a lot.*” In the future, the format for poster time should be done early in class rather than later, a point also made in the survey. One student keenly observed: “*I really enjoyed getting to see what other people came up with—especially since it so directly showed how they think and feel about the subject. I think an important part of learning a subject is to see how others react to it.*”

Suggestions for improving the short project included more time for the presenters, more topics for the PowerPoint presentations for variety, a stronger focus in the PowerPoint presentations on nutrition,

A Learning Style

rather than a food log, class time given to each poster presenter and paper writer, and mixing up PowerPoint, paper and poster presenters. Overall comments included: "Thank you for the opportunity!" "It was fun," and perhaps most encouraging, "Keep them rolling for next year."

The survey e-mailed to the class and its results have some limits to its interpretation. Possibly only students who were happy with the short project may have responded. Those that were unhappy or neutral may not have responded. Since the survey was sent out after grades were posted, student grades may have influenced whether or not they chose to respond to the survey, despite the intent to keep the two separate. Students who chose to take classes during the summer II session or who left the campus may have also chosen not to complete the survey. The sample size of responses (17) represents 30% of the class, and could not be interpreted beyond that group from the course. Also, in the initial e-mail presenting the survey, the class was told the results would be published. Thus students interested in recognition, research or publication may have been more motivated to complete the survey, while those not interested in these things or who may not have wished to have their thoughts potentially made public may have chosen not to complete the survey. As the survey was sent by e-mail, it was not anonymous, which may have limited some responses. There were no questions within the survey asking for class standing or overall GPA, so the resulting data could not be stratified by those parameters.

Quantitative data from end-of-semester feedback

As the author also taught the course during the summer 2006 term, applicable quantitative data from end-of-semester evaluations illustrates the contribution of the short project (Table 3). All course materials were the same between the two classes with the exception of the added short project. While it is not possible to entirely attribute the improved ratings to the short project, the qualitative and quantitative data is correlated. Improvements in attentiveness support the qualitative assertion above that the short projects helped the students better connect course material with their life outside of the classroom. Students gained a greater appreciation for nutrition by applying it to their lives through the short projects, thus improving scores on improving viewpoints and appreciations. Interest likely increased because an aspect of the course was directly related to them and this spilled over into other parts of the course. Finally, perceptions of course quality

and content also increased, suggesting that by adding a choice and learning style based project the course improved as a whole.

Table 3. Selected Items from FSHN 120 End-of-Semester Feedback Comparing Summer 2006 (no short project) and Summer 2007 (short project added)

Evaluation item	Summer 2006 ²	Summer 2007
Instructors overall teaching effectiveness	4.6 out of 5	4.7 out of 5
Overall quality of the course	4.6	4.6
It was easy to remain attentive	3.8	4.3
The instructor encouraged development of new viewpoints and appreciations	4.3	4.6
It was quite interesting	4.1	4.6
I think the course was taught quite well	4.4	4.7
The course content was excellent	4.0	4.4

²Eighteen students completed the evaluation in summer 2006 and 36 completed the evaluation in summer 2007.

Summary

Based on the survey data collected, quality of the course, motivation, and participation increased among the survey group as a result of the short project. Students stated the element of choice as being a primary motivator to engaging in their short projects. That element of choice also led to accountability, meaning internalizing the project, thinking about it ahead of time, wanting it to be valued and appreciated, even outside the course (e.g. reading it to a friend before turning it in). Quantitative data comparing the course over two summers supported the conclusions of the qualitative survey data. A choice and learning style-based project would likely contribute positively to future small-enrollment courses.

Literature Cited

- Felder, R.M. and L.K. Silverman. 1988. Learning and teaching styles in engineering education. *Engineering Education* 78(7): 674-681.
- Fleming, N.D. and C. Mills. 1992. Not another inventory, rather a catalyst for reflection. *To Improve the Academy* 11:137.
- Frymier, A.B., G.M. Shulman, and M. Houser. 1996. The development of a learner empowerment measure. *Communication Education* 45: 181-199.
- Gregorc, A.F. 1982. *An adult's guide to style*. Maynard, MA: Gabriel Systems.
- Hand, B., V. Prain, and C. Wallace. 2002. Influences of writing tasks on students' answers to recall and higher-level test questions. *Research in Science Education* 32: 19-34.
- Holme T.A. and B.W. Lloyd. 1993. Un-depersonalizing the large-lecture, entry-level chemistry course. *Jour. of Chemical Education* 70: 933-935.
- Kim, M.C., M. J. Hannafin, and L.A. Bryan. 2007. Technology-enhanced inquiry tools in science education: An emerging pedagogical framework for classroom practice. *Science Education* 91: 1010-1030.
- Koth, C.W., C. P. Bradshaw, and P.J. Leaf. 2008. A multilevel study of predictors of student percep-

- tions of school climate: The effect of classroom-level factors. *Jour. of Educational Psychology* 100: 96-104.
- Lewis, L.K. and P.A. Hayward. 2003. Choice-based learning: Student reactions in an undergraduate organizational communication course. *Communication Education* 52: 148-156.
- Myers, I.B. with P.B. Myers. 1995. *Gifts differing: Understanding personality type*. Mountain View, CA: Davies-Black Publishing.
- Neuville, S., M. Frenay, and E. Bourgeois. 2007. Task value, self-efficacy and goal orientations: Impact on self-regulated learning, choice and performance among university students. *Psychologica Belgica* 47: 95-117.
- Nolinske, T. and B. Millis. 1999. Cooperative learning as an approach to pedagogy. *American Jour. of Occupational Therapy* 53: 31-40.
- Padilla-Walker, L.M., Zamboanga, B.L., Thompson, R.A., and L.A. Schmersal. 2005. Extra credit as incentive for voluntary research participation. *Teaching of Psychology* 32: 150-153.
- Samples, B. 1994. Instructional diversity: Teaching to your student's strengths. *The Science Teacher* 61: 14-17.



**Check out the new look to
NACTAteachers.org**