

# An Examination of Motivation Model Components in Face-to-Face and Online Instruction

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## Abstract

**Introduction.** The MUSIC Model of Academic Motivation consists of psychological components (i.e., empowerment, usefulness, success, interest, and caring) that have been derived from research and theory as ones that are critical to student engagement in academic settings. The purpose of this study was to: (1) determine whether men and women rate these psychological components differently in traditional face-to-face and online courses, and (2) determine which of the psychological components best predicts men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course.

**Method.** Participants included 245 students in a face-to-face course and 218 students in an online course who completed a questionnaire in a Personal Health course at a large public university in the U.S. I conducted correlation, analysis of variance (ANOVA), and regression analyses to examine the data.

**Results:** Although several similarities between sexes and course types (face-to-face and online) existed for the components of the MUSIC model, I also documented many differences. Overall, the pattern of results indicated that the components of the MUSIC model were significantly related to students' effort, instructor ratings, and course ratings. In all conditions, instructor rating was best predicted by academic caring, course rating was best predicted by situational interest, and achievement was best predicted by perceptions of success.

**Conclusion.** To maximize students' effort and achievement, as well as their instructor and course ratings in both face-to-face and online courses, instructors should consider the components of the MUSIC Model of Academic Motivation.

**Keywords:** motivation; effort; MUSIC model; online instruction; online education; distance education

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# Estudio de componentes de un modelo de motivación en la enseñanza presencial y online

## Resumen

**Introducción.** El Modelo de Motivación Académica MUSIC lleva consigo componentes psicológicos (empoderamiento, utilidad, éxito, interés y cuidado) que la investigación y la teoría han identificado como elementos importante para la auténtica participación de estudiantes en la escuela. El propósito de este estudio fue: (1) determinar si las mujeres y los hombres le dieron una calificación diferente a estos componentes psicológicos en cursos presenciales y cursos a distancia, y (2) determinar cuál de los componentes psicológicos predice mejor el esfuerzo, la calificación al instructor, la calificación del curso, y el rendimiento en cursos presenciales y a distancia entre hombres y mujeres.

**Método.** En el estudio participaron 245 estudiantes en el curso presencial y 218 estudiantes en el curso a distancia. Los datos fueron analizados usando análisis de correlación, de varianza, y de regresión.

**Resultados.** Primero, aún cuando existen muchas semejanzas para los componentes del modelo MUSIC entre género y tipo de curso (presencial o a distancia), se encontraron algunas diferencias. En ambos casos, la calificación del instructor se predijo por la atención académica, la calificación del curso se predijo mejor por el interés situacional, y finalmente, las percepciones de éxito por parte de los estudiantes fueron los que mejor predijeron su rendimiento.

**Conclusiones:** Para maximizar el rendimiento de los estudiantes y del instructor, así como también de las calificaciones de los cursos presenciales y de los cursos a distancia, los instructores deberían considerar los componentes del modelo MUSIC de la motivación académica.

**Palabras Clave:** motivación; esfuerzo; modelo MUSIC; instrucción en línea; educación en línea; educación a distancia

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## Introduction

Effective instructors consider how their teaching methods affect students' effort and achievement. A related consideration for some instructors is how their students will rate them and their course. Although some instructors might deny that instructor and course ratings are critical to their instructional design, it is difficult to argue that instructor and course ratings are unimportant given that many institutions use them as the primary measure of teaching effectiveness for decisions related to promotion, tenure, and merit pay. Because of the importance of student effort, student achievement, instructor ratings, and course ratings, researchers have examined the impacts of psychological constructs on these outcomes (e.g., Caulfield, 2010; Faye & Sharpe, 2008; Filak & Sheldon, 2008; Remedios & Lieberman, 2008). The aim of this study was to extend this area of research by examining a broader set of psychological constructs within the context of a traditional face-to-face course and an online course.

Based on research and theory, Jones (2009, 2010) developed the MUSIC Model of Academic Motivation that consists of psychological constructs that instructors should consider when designing courses to motivate students to engage in learning. The name of the model, MUSIC, is an acronym based on the second letter of the first component (i.e., eMpowerment) and the first letter of the other four components: Usefulness, Success, Interest, and Caring. The Interest component can be sub-divided into Situational Interest and Individual Interest, and the Caring component can be divided into Academic Caring and Personal Caring. Each of these components has been studied individually, or in combination with one or more of the other components, and they all have been shown to be important to students' motivation (for citations, see Jones, 2009). However, the relationships among the components and students' effort, instructor ratings, course ratings, and achievement have not been assessed together in one study. Furthermore, studies of comparisons between face-to-face and online instruction for these constructs have not been conducted. The purpose of this study was to address these needs by answering the following questions: (a) Are there significant differences in the MUSIC model components based on students' sex (female or male), course type (face-to-face or online), or both? (b) Are the MUSIC model components related to students' effort, instructor ratings, course ratings, and achievement in a face-to-face and online course? and (c) Which of the MUSIC model components best predicts men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course? I analyzed the data by sex because researchers have documented differences between men and women for some psy-

chological constructs (e.g., expectancy and competence beliefs; Wilkins, 2004; Zastavker, Ong, & Page, 2006) and other studies have reported sex differences for beliefs about ratings of college teaching (e.g., Balam & Shannon, 2010).

## **Theoretical Framework**

The field of motivation is divided into many “mini-theories” (Reeve, 2005) that can make it difficult for instructors to know which ones should be considered when designing instruction. To help instructors understand and implement the many research studies and theories available to them, Jones (2009, 2010) developed the MUSIC Model of Academic Motivation (see [www.MotivatingStudents.info](http://www.MotivatingStudents.info)). Jones created the MUSIC model by analyzing, evaluating, and synthesizing motivation research and theories from fields such as education and psychology. As a result, the MUSIC model does not consist of completely *new* motivation constructs; rather, the model integrates aspects of existing motivation constructs that are important for instructors to consider in educational settings. Results of confirmatory factor analysis provide evidence that the MUSIC model components are distinct factors (Jones & Wilkins, 2010). In this section, I provide a brief description of the MUSIC Model of Academic Motivation (for further explanation, see Jones, 2009).

The empowerment component of the MUSIC model represents the concept that instructors need to ensure that students perceive that they have some control over their learning. This component is based on research related to locus of causality (deCharms, 1968, 1976) and self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000). Individuals who are empowered feel that they are the origin of their behavior (i.e., they have an internal perceived locus of causality) and feel that they have the ability to make their own choices. The usefulness component specifies that instructors need to ensure that the content is useful to students’ short- and long-term goals because students’ motivation is affected by their perceptions of the usefulness of what they are learning for the future (De Volder & Lens, 1982; Eren, 2009; Phan, 2008; Tabachnick, Miller, & Relyea, 2008). Students who perceive their schoolwork to be less relevant to their goals tend to be less motivated than those who understand the relevance in their schoolwork and have a positive outlook on their future (Simons, Vansteenkiste, Lens, & Lacante, 2004; Van Calster, Lens, & Nuttin, 1987). For the success component, instructors need to ensure that students believe that they can succeed if they have the required knowledge and skills and put forth the appropriate effort. This component is important be-

cause self-perceptions of competence are central to many motivation theories, such as self-concept theory (Marsh, 1990), self-efficacy theory (Bandura, 1986), self-worth theory (Covington, 1992), goal orientation theory (Ames, 1992), and expectancy-value theory (Wigfield & Eccles, 2000).

For the interest component, instructors need to interest students in the course activities and topics. Interest can be defined as “liking and willful engagement in a cognitive activity” (Schraw & Lehman, 2001, p. 23). It is a psychological state that consists of an affective component of positive emotion (the liking) and a cognitive component of concentration (the engagement; Hidi & Renninger, 2006). Interest can be separated into two theoretically distinct sub-components: situational interest and individual interest (Hidi & Renninger, 2006). Situational interest (similar to curiosity) is of temporary value, environmentally activated, and context-specific, whereas individual interest is of enduring personal value, internally activated, and topic-specific (Schraw & Lehman, 2001). Instructors need to design instruction that creates situational interest, as well as instruction that fosters a more enduring interest in the course content.

The caring component of the MUSIC model is derived from research in the areas of belongingness, relatedness, connectedness, affiliation, involvement, attachment, commitment, bonding, and sense of community. The underlying principle of the caring component is that all humans have a need to establish and sustain caring interpersonal relationships (Baumeister & Leary, 1995; Ryan & Deci, 2000). The caring component can be divided into two components: academic caring and personal caring (Johnson, Johnson, & Anderson, 1983). Academic caring specifies that instructors need to demonstrate to students that they care about whether or not they successfully meet the course objectives. For personal caring, instructors need to show students that they care about their welfare.

Although it is beyond the scope of this paper to compare the MUSIC model to other motivation models, it might be useful to some readers if I provide a brief comparison of the MUSIC model to the ARCS model (Attention, Relevance, Confidence, and Satisfaction; Keller, 1979, 1987) because it is one of the few motivation models that is as comprehensive as the MUSIC model. The MUSIC model is similar to the ARCS model in that both models were developed based on motivational and psychological research and theory to be used by instructors to motivate students. As a result, the models contain some of the same basic ideas

and are not contradictory. For example, some of the ideas in the success component of the MUSIC model are similar to the ideas in the “confidence” condition in the ARCS model, the ideas in the usefulness component are similar to some of the ideas in the “relevance” condition in the ARCS model, and some of the ideas in the situational interest component are similar to the ideas in the “attention” condition in the ARCS model. Differences between the models exist in the amount of emphasis placed on certain concepts, which is likely due to the fact that the MUSIC model was developed about 30 years after the ARCS model. Consequently, the MUSIC model is situated in more recent research and theoretical frameworks. As evidence, certain concepts are more prominent in the MUSIC model than in the ARCS model, such as empowerment (e.g., Ryan & Deci, 2000), situational and individual interest (e.g., Hidi, 2006; Hidi & Renninger, 2006), and caring (e.g., Freeman, Anderman, & Jensen, 2007; Furrer & Skinner, 2003), which have been studied more intensively in educational settings in the past couple decades.

## **Objectives and Goals**

My specific research questions related to seven components of the MUSIC Model of Academic Motivation (i.e., empowerment, usefulness, success, situational interest, individual interest, academic caring, and personal caring) were:

1. Do the responses of men and women in a college course differ significantly for the seven components, effort, instructor ratings, or course ratings?
2. Do students' responses in a face-to-face course differ significantly from students' responses in an online course for the seven components, effort, instructor ratings, or course ratings?
3. Is there a sex by course type interaction whereby sex has one effect in a face-to-face course, but a different effect in an online course for the seven components, effort, instructor ratings, or course ratings?
4. Are the seven components statistically correlated with men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course?
5. Which of the seven components best predicts men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course?

## Method

### *Participants*

The undergraduate participants were enrolled in either a traditional face-to-face or on-line course titled “Personal Health” at a large, public, U.S. university. The participants’ demographic information is provided in Table 1.

Table 1. *Participant Demographics*

Variable	Face-to-face n (%)	Online n (%)
Sex		
Female	95 (38.8%)	140 (64.2%)
Male	150 (61.2%)	78 (35.8%)
Race/ethnicity		
White/Caucasian	177 (72.2%)	176 (80.7%)
Asian/Pacific Islander	39 (15.9%)	22 (10.1%)
Black/African-American	13 (5.3%)	6 (2.8%)
Other	10 (4.1%)	5 (2.3%)
Native American	3 (1.2%)	0
Not reported	2 (0.8%)	2 (0.9%)
Hispanic	1 (0.4%)	7 (3.2%)
Academic standing		
First year	23 (9.4%)	10 (4.6%)
Sophomore	72 (29.4%)	43 (19.7%)
Junior	59 (24.1%)	50 (22.9%)
Senior	90 (36.7%)	115 (52.8%)
Not reported	1 (0.4%)	0

### *Instruments*

I conducted a brief study to establish some validity for the scale scores for my sample. Two faculty members who teach undergraduate students read all of the scale items to ensure that the content and readability of the questions were appropriate for undergraduate students (Haynes, Richard, & Kubany, 1995). I made minor revisions to some of the items based on



their suggestions. Next, I asked 23 first-year students who did not participate in the study, but who attended the same university as those who did, to anonymously rate each of the scale items and to provide recommendations for how to revise items that they rated a lower. Based on students' feedback, I deleted items or revised them in ways that I have described in the sections that follow. I provide a complete list of the items in the Appendix along with the Cronbach alpha reliability estimates ( $\alpha$ ) for each scale in order of (1) females in the face-to-face course, (2) males in the face-to-face course, (3) females in the online course, and (4) males in the online course. I provided Chronbach's alpha for each scale by sex and course type to show that the values were very good for men and women in both the face-to-face and online courses.

I measured *empowerment* using five items from the 6-item, short version of the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996) that measures the degree to which students perceive the instructor as supporting their autonomy. I did not use one of the six items, I shortened another item, and I changed the wording in three of the items to make it past tense ( $\alpha = .81, .85, .92, .91$ ). I measured *usefulness* using items slightly modified from the three-item utility value scale used by Hulleman, Durik, Schweigert, and Harackiewicz (2008). This scale measures the extent to which students perceived the course to be useful to their life and future. In all three items, I changed the wording from "class" to "course" and changed the word "career" in one item to "my future" to make the question more general, as opposed to limiting it to the student's career ( $\alpha = .88, .86, .94, .93$ ).

To measure *success*, I used the 4-item Perceived Competence Scale, which assesses students' feelings of competence in a course (<http://www.psych.rochester.edu/SDT/>; Williams & Deci, 1996; Williams, Freedman, & Deci, 1998). I changed the wording slightly for one item ( $\alpha = .88, .84, .92, .86$ ). To measure *situational interest*, I used three items that are similar to those used by researchers to measure "intrinsic interest value" and "interest" (e.g., Eccles & Wigfield, 1995; Simpkins, Davis-Kean, & Eccles, 2006; Wigfield & Eccles, 2000). This situational interest scale measures the degree to which students enjoy and are interested in the course ( $\alpha = .88, .87, .90, .85$ ). The *individual interest* scale is based on the work of Schmader, Major, and Gramzow (2001) who created a four-item "Devaluing" scale that measured the extent to which undergraduate students devalued academics. I modified their devaluing scale by reverse coding all of the items, deleting one item, and replacing more general terms, such as "academics," "school," and "intellectual tasks," with "this course" to focus students on

their perceptions of the course. Thus, this individual interest scale measured the extent to which students found the course important and valuable to them ( $\alpha = .80, .69, .89, .85$ ).

I measured *academic* and *personal caring* using two, 4-item subscales of the Classroom Life Instrument (Johnson et al., 1983) titled “Teacher Academic Support” and “Teacher Personal Support.” These scales measure students’ perceptions of teacher support in the academic and personal dimensions, respectively. I re-wrote all of the items from present tense to past tense. For the academic caring scale ( $\alpha = .84, .89, .94, .93$ ), I re-wrote one item from “likes to see my work” to “wanted me to do well in the course.” For the personal caring scale ( $\alpha = .83, .85, .92, .86$ ), I re-wrote one item from “thinks it is important to be my friend” to “thought it was important to get to know me.” I also added “as a person” to the end of the item “really cares about me.”

I used a 4-item measure of *effort* that was based on the 5-item Effort/Importance scale that is part of the Intrinsic Motivation Inventory (<http://www.psych.rochester.edu/SDT/>; Plant & Ryan, 1985). This effort scale assesses the amount of perceived effort that students put forth in a course ( $\alpha = .84, .84, .86, .84$ ). I did not use one of the items because during the validation process, students found it confusing and unclear. The original scale refers to putting forth effort in “this,” “this activity,” or “this task” and I changed these wordings to “this course” to make it clear to what the effort was referring.

I assessed students’ *achievement* by using the total number of points that they received on the four exams in the course. To measure students’ overall perceptions about the instructor and course ratings, I used one item for the *instructor rating* and another item for the *course rating*. Both items had a 7-point Likert-type format scale with a descriptor at each point ranging from 1 (*terrible*) to 7 (*excellent*). The exact wording of the items was: “My overall rating of my instructor is:” and “My overall rating of the course is:” I selected these items because they are similar to the one-item scales completed by students on their official university course evaluation forms at the end of a course.

### *Procedure*

The Personal Health course was taught as a traditional face-to-face course in the 16-week fall semester and online in the following 16-week spring semester. The same instructor

taught both courses, and the course description, objectives, and textbook were the same in both courses. The course description in both syllabi stated that “This course is designed to provide students with health information, based on scientific principles that will enable him/her to make sound decisions regarding his/her health.” The course included material from 13 chapters of a textbook that covered topics such as wellness, mental health, substance abuse, alcohol, tobacco, cardiovascular health, cancer, communicable diseases, consumer health, nutrition, fitness, and human sexuality. The course was not a requirement for any of the students as part of their university coursework.

The general format for the face-to-face course was a “lecture” in which the students sat in an auditorium and the female instructor presented information to students verbally and showed images and text on a large screen in the front of the room. The instructor provided 10 lectures and guest speakers provided five lectures, for a total of 15 lectures throughout the semester. The instructor estimated that about one-half to two-thirds of the students attended class on a regular basis. For the online course, students read the textbook and completed complementary activities available at the textbook website. One additional requirement for the online course was that students were required to attend one workshop at the campus health center or complete five online self-assessments. Although interaction has been identified as an important component of online learning (see Roblyer & Wiencke, 2003, for a discussion), this course did not provide opportunities for interaction except via email correspondence with the instructor and, for students who attended the optional campus workshop, with the workshop participants and instructor (who was not the course instructor). In both courses, students were assessed with four exams that were weighted equally towards students’ final course grade. The exams included questions in the format of true/false and multiple-choice and assessed content material from the textbook.

### *Design and Statistical Analysis*

Students in the face-to-face course completed a questionnaire during the second to last class of the semester. Students in the online course were asked by their instructor to complete an online questionnaire at the beginning of the last week of classes and were sent two reminder emails over the following two weeks. In the face-to-face course, 245 (78.5%) of the 312 students enrolled in the course completed the questionnaire, whereas 218 (33.7%) of the 646 students enrolled in the online course completed it.

I used SPSS 14.0 to conduct several different types of analyses, including correlational, analysis of variance (ANOVA), and linear regression. Typically, I used an alpha level of .05 for the statistical tests. However, I used a stricter alpha level for the ANOVA tests to address the problem of multiple comparisons and I set the critical level of statistical significance ( $\alpha$ ) at 0.01. For all of the stepwise regression analyses, I set the entry probability of  $F$  at .05 and the removal probability of  $F$  at .10. I examined the tolerance values as measures of collinearity for the regression analyses and I found them all to be acceptable (i.e., greater than 0.25).

## Results

### *Research Questions 1, 2, and 3: Examining Differences by Sex and Course Type*

To address research questions one, two, and three, I conducted a separate two-way ANOVA for each variable to determine whether there were differences for sex (females versus males), course type (face-to-face versus online), or the interaction between sex and course type. The means, standard deviations, and results of the two-way ANOVAs are presented in Table 2. The first research question asked: Do the responses of men and women in a college course differ significantly for the seven components, effort, instructor ratings, or course ratings (i.e., Is there a main effect for sex)? I documented a statistically significant difference between men and women for four of the 10 analyses, as noted by the asterisks in the “Sex (S)” column in Table 2. Women rated usefulness, situational interest, and individual interest higher than men, whereas men rated personal caring higher than women.

The second research question asked: Do students’ responses in a face-to-face course differ significantly from students’ responses in an online course for the seven components, effort, instructor ratings, or course ratings (i.e., Is there a main effect for course type)? As shown by the asterisks in the “Course (C)” column of Table 2, eight of the 10 analyses were statistically significant. The average rating by students in the online course was higher than the ratings by students in the face-to-face course for all eight variables, including empowerment, usefulness, situational interest, individual interest, personal caring, effort, instructor rating, and course rating.

Table 2. Means, Standard Deviations, and ANOVA for Sex as a Function of Course Type

Sex	Face-to-face <i>M (SD)</i>	Online <i>M (SD)</i>	ANOVA $F^a$ ( $\eta^2_p$ )		
			Sex (S)	Course (C)	S X C
Empowerment			3.36 (< .01)	18.71*** (.04)	3.45 (< .01)
Female	5.36 (0.92)	5.61 (1.13)			
Male	4.97 (1.12)	5.62 (1.10)			
Total	5.12 (1.06)	5.61 (1.12)			
Usefulness			9.40** (.20)	20.52*** (.04)	0.04 (< .01)
Female	5.87 (0.90)	6.26 (0.84)			
Male	5.58 (1.02)	6.00 (0.90)			
Total	5.70 (0.99)	6.17 (0.87)			
Success			2.19 (< .01)	2.19 (< .01)	0.25 (< .01)
Female	6.50 (0.68)	6.56 (0.60)			
Male	6.38 (0.67)	6.50 (0.62)			
Total	6.43 (0.67)	6.54 (0.61)			
Situational interest			8.24** (.02)	90.96*** (.12)	0.19 (< .01)
Female	5.29 (1.01)	6.16 (0.80)			
Male	4.98 (1.15)	5.93 (0.94)			
Total	5.10 (1.11)	6.08 (0.86)			
Individual interest			11.26*** (.02)	29.21*** (.06)	4.74 (.01)
Female	6.28 (0.81)	6.52 (0.65)			
Male	5.85 (0.93)	6.43 (0.71)			
Total	6.02 (0.91)	6.49 (0.67)			
Academic caring			0.72 (< .01)	5.47 (.01)	2.54 (< .01)
Female	6.06 (0.89)	6.14 (1.18)			
Male	5.82 (1.02)	6.21 (0.95)			
Total	5.91 (0.98)	6.16 (1.10)			
Personal caring			8.07** (.02)	22.72*** (.05)	0.02 (< .01)
Female	4.57 (1.39)	5.23 (1.73)			
Male	4.96 (1.35)	5.65 (1.31)			
Total	4.81 (1.37)	5.38 (1.61)			
Effort			5.60 (.01)	46.75*** (.09)	2.50 (< .01)
Female	4.57 (1.12)	5.22 (1.35)			
Male	4.08 (1.28)	5.12 (1.40)			
Total	4.27 (1.24)	5.18 (1.36)			
Instructor rating			0.38 (< .01)	24.38*** (.05)	4.55 (.01)
Female	6.01 (1.07)	6.26 (0.90)			
Male	5.87 (1.00)	6.51 (0.68)			
Total	5.93 (1.03)	6.35 (0.84)			
Course rating			0.75 (< .01)	41.07*** (.08)	0.22 (< .01)
Female	5.59 (1.24)	6.32 (0.87)			
Male	5.55 (1.07)	6.18 (1.36)			
Total	5.56 (1.14)	6.27 (1.07)			

Notes: All items were rated on a 7-point Likert-type scale. In the face-to-face course, n = 95 for females and n = 150 for males. In the online course, n = 140 for females and 78 for males.

<sup>a</sup> df = 1, 459

\*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

Presented in the “S X C” column of Table 2 are the findings relevant to address the third research question: Is there a sex by course type interaction whereby sex has one effect in a face-to-face course, but a different effect in an online course for the seven components, ef-

fort, instructor ratings, or course ratings? The results indicate that there is not a significant sex by course type interaction for any of the 10 analyses.

#### *Research Question 4: Investigating Relationships Among Variables*

I computed Pearson correlation coefficients to answer the fourth research question: Are the seven components statistically correlated with men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course? For 78 of the 84 correlations computed (not including the correlations with achievement; see Table 3), the MUSIC model components were statistically, positively correlated with effort, instructor ratings, and course ratings. The six exceptions were that: empowerment was not correlated with effort for females in the face-to-face course, empowerment was not correlated with the course rating for men in the online course, success was not correlated with effort for men or women in the face-to-face course, success was not correlated with course rating for the men in the online course, and personal caring was not correlated with course rating for the men in the online course. I was unable to calculate the correlations with achievement for the online course because almost all students (99%) received an A in the course which made the variance too small to conduct any meaningful statistical analysis. For the face-to-face course, four of the 14 correlations with achievement were positive and statistically significant: success and situational interest for men, and success and academic caring for women (see Table 3).

#### *Research Question 5: Predicting Effort, Instructor Rating, Course Rating, and Achievement*

I used stepwise multiple regression to answer the fifth research question that asked: Which of the seven components best predicts men and women's effort, instructor ratings, course ratings, and achievement in a face-to-face and online course? I chose to use a stepwise multiple regression because some of the predictor variables were highly correlated and the only aim of the analysis was to determine the best predictors (Tabachnick & Fidell, 1996). Standard multiple regression, which only measures the unique contribution of each predictor variable, would reduce the importance of any one variable that was highly correlated with another variable. Stepwise regression eliminates this problem by adding variables one at a time, starting with the variable that correlates most strongly with the criterion variable.

Table 3. *Intercorrelations Among Variables*

Variables	Effort		Instructor rating		Course rating		Achievement
	FTF	Online	FTF	Online	FTF	Online	FTF
1. Empowerment							
Females	.18	.44***	.34***	.60***	.27**	.46***	-.12
Males	.46***	.52***	.42***	.46***	.33***	.19	-.02
2. Usefulness							
Females	.34***	.35***	.43***	.33***	.44***	.48***	.01
Males	.42***	.61***	.26**	.26*	.33***	.44***	.10
3. Success							
Females	< .01	.29***	.53***	.33***	.43***	.40***	.45***
Males	< .01	.22***	.28***	.22*	.35***	.01	.34***
4. Situational interest							
Females	.42***	.33***	.58***	.55***	.60***	.65***	.10
Males	.43***	.62***	.44***	.30**	.55***	.57***	.20*
5. Individual interest							
Females	.45***	.32***	.30**	.32***	.35***	.39***	.02
Males	.42***	.36***	.27***	.47***	.29***	.26*	.06
6. Academic caring							
Females	.21*	.38***	.65***	.67***	.52***	.44***	.21*
Males	.26***	.37***	.47***	.48***	.34***	.24*	.01
7. Personal caring							
Females	.31**	.50***	.44***	.53***	.37***	.36***	-.11
Males	.34***	.38***	.41***	.39***	.30***	.01	-.03

Note. FTF is an abbreviation for "face-to-face."

\*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

For the women in the face-to-face course, individual interest was the largest predictor of effort, followed by situational interest (see Table 4 for the amount of variance explained by the predictors). For the men in the face-to-face course, empowerment was the largest predictor of effort, followed by situational and individual interest. Success was also included in the face-to-face course models for men and women, but it was not a predictor variable; rather, it was a suppressor variable because it was not correlated with effort (see Table 3). As a suppressor variable, success increased the amount of variance explained in the dependent variable (i.e., effort) by removing (suppressing) the unwanted variance in the other independent variables (Cohen, Cohen, West, & Aiken, 2003). Thus, by its inclusion in the regression models, success increased the  $R^2$  value for the regression models even though it was not correlated with effort.

In the online course, personal caring and usefulness were the two significant predictors of effort for women. Interestingly, these two factors were different from the factors (i.e., indi-

vidual and situational interest) that predicted effort for women in the face-to-face course. For men in the online course, situational interest and empowerment were both predictors of effort, similar to the face-to-face course; but individual interest was not a predictor.

Table 4. *Stepwise Regression Analysis of Predictors of Effort by Sex and Course Type*

Step	Predictor variable	$\Delta R^2$	$R^2$	$df$	$\Delta F$	B	SE B	$\beta^a$	$t$
Face-to-face course									
Females									
Step 1		0.20	0.20	93	23.07***				
	Individual interest					.62	.13	.45	4.80***
Step 2		0.08	0.28	92	9.68**				
	Individual interest					.46	.13	.33	3.48***
	Situational interest					.33	.11	.30	3.11**
Step 3		0.05	0.33	91	7.15*				
	Individual interest					.53	.13	.39	4.07***
	Situational interest					.41	.11	.37	3.83***
	Success					-.42	.16	-.25	-2.67**
Males									
Step 1		0.22	0.22	148	40.55***				
	Empowerment					.53	.08	.46	6.37***
Step 2		0.06	0.28	147	12.42***				
	Empowerment					.39	.09	.34	4.33***
	Situational interest					.31	.09	.28	3.52***
Step 3		0.04	0.31	146	7.38**				
	Empowerment					.29	.10	.25	3.04**
	Situational interest					.27	.09	.24	3.14**
	Individual interest					.29	.11	.21	2.72**
Step 4		0.03	0.34	145	6.96**				
	Empowerment					.30	.09	.27	3.25***
	Situational interest					.29	.09	.26	3.43***
	Individual interest					.36	.11	.26	3.29***
	Success					-.36	.14	-.19	-2.64**
Online course									
Females									
Step 1		0.25	0.25	138	46.69***				
	Personal caring					.39	.06	.50	6.83***
Step 2		0.06	0.31	137	12.03***				
	Personal caring					.35	.06	.45	6.13***
	Usefulness					.40	.12	.25	3.47***
Males									
Step 1		0.38	0.38	76	46.99***				
	Situational interest					.92	.13	.62	6.86***
Step 2		0.07	0.45	75	9.28**				
	Situational interest					.72	.14	.48	5.00***
	Empowerment					.38	.12	.29	3.05**

\*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

<sup>a</sup> Standardized coefficient  $\beta$



The predictors for the overall instructor ratings were very similar for both sexes and course types. Academic caring was the best predictor of instructor ratings for both sexes and course types, explaining over 40% of the variance for women and over 20% for men (see Table 5). For both men and women in the face-to-face course and women in the online course, situational interest was the second largest predictor; individual interest was the second largest predictor for men in the online course. Empowerment was also a significant predictor for men in the face-to-face course and women in the online course.

Table 5. *Stepwise Regression Analysis of Predictors of Instructor Rating by Sex and Course*

Step	Predictor variable	$\Delta R^2$	$R^2$	<i>df</i>	$\Delta F$	B	SE B	$\beta^a$	<i>t</i>
Face-to-face course									
Females									
Step 1		0.42	0.42	93	67.27***				
	Academic caring					.78	.10	.65	8.20***
Step 2		0.11	0.53	92	22.26***				
	Academic caring					.59	.09	.49	6.28***
	Situational interest					.39	.08	.37	4.72***
Males									
Step 1		0.22	0.22	148	42.74***				
	Academic caring					.47	.07	.47	6.54***
Step 2		0.05	0.28	147	11.10***				
	Academic caring					.33	.08	.34	4.15***
	Situational interest					.23	.07	.27	3.33***
Step 3		0.02	0.30	146	5.09*				
	Academic caring					.27	.08	.27	3.20**
	Situational interest					.19	.07	.22	2.65**
	Empowerment					.17	.07	.19	2.26*
Online course									
Females									
Step 1		0.45	0.45	138	111.08***				
	Academic caring					.51	.05	.67	10.54***
Step 2		0.08	0.53	137	24.12***				
	Academic caring					.41	.05	.53	8.13***
	Situational interest					.36	.07	.32	4.91***
Step 3		0.03	0.56	136	10.44**				
	Academic caring					.31	.06	.41	5.51***
	Situational interest					.31	.07	.27	4.16***
	Empowerment					.19	.06	.24	3.23**
Males									
Step 1		0.23	0.23	76	22.79***				
	Academic caring					.34	.07	.48	4.77***
Step 2		0.09	0.32	75	10.35**				
	Academic caring					.25	.07	.35	3.33***
	Individual interest					.32	.10	.33	3.22**

\*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

<sup>a</sup> Standardized coefficient  $\beta$

Situational interest was the best predictor of overall course rating for men and women in both the face-to-face and the online course (see Table 6). The second best predictor for women in the face-to-face course was academic caring, whereas the second best predictor for women in the online course was empowerment. The second best predictor for men in the face-to-face course was success. Success was also included in the Step 2 regression model for men in the online course; however, in this model, success was a suppressor variable because it was not significantly correlated with effort ( $r = .01$ ). As a suppressor variable, success increased the  $R^2$  value for the regression model by 5% even though it was not correlated with effort.

Table 6. *Stepwise Regression Analysis of Predictors of Course Rating by Sex and Course*

Step	Predictor variable	$\Delta R^2$	$R^2$	$df$	$\Delta F$	B	SE B	$\beta^a$	$t$
Face-to-face course									
Females									
Step 1		0.36	0.36	93	52.23***				
	Situational interest					.74	.10	.60	7.23***
Step 2		0.09	0.45	92	15.01***				
	Situational interest					.57	.11	.46	5.42***
	Academic caring					.46	.12	.33	3.87***
Males									
Step 1		0.31	0.31	148	65.53***				
	Situational interest					.51	.06	.55	8.10***
Step 2		0.06	0.36	147	12.85***				
	Situational interest					.47	.06	.50	7.50***
	Success					.39	.11	.24	3.58***
Online course									
Females									
Step 1		0.43	0.43	138	102.02***				
	Situational interest					.71	.07	.65	10.10***
Step 2		0.04	0.46	137	10.08**				
	Situational interest					.61	.08	.56	8.01***
	Empowerment					.17	.05	.22	3.18**
Males									
Step 1		0.33	0.33	76	37.14***				
	Situational interest					.82	.14	.57	6.09***
Step 2		0.05	0.38	75	5.67*				
	Situational interest					.95	.14	.66	6.71***
	Success					-.51	.22	-.23	-2.38**

\*  $p \leq .05$ ; \*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

<sup>a</sup> Standardized coefficient  $\beta$

Because the variance in students' achievement in the online course was very small, I was unable to calculate the predictors of achievement for the online course. However, the results of the regression analysis for achievement in the face-to-face course are presented in

Table 7. Success was the best predictor of achievement for both men and women. Although empowerment was included in Step 2 for women, it was a suppressor variable because it was not significantly correlated with achievement ( $r = -.12$ ).

Table 7. *Stepwise Regression Analysis of Predictors of Achievement by Sex*

Step	Predictor variable	$\Delta R^2$	$R^2$	$df$	$\Delta F$	B	SE B	$\beta^a$	$t$
Face-to-face course									
Females									
Step 1		0.20	0.20	93	23.71***				
	Success					10.80	2.22	.45	4.87***
Step 2		0.08	0.28	92	9.87**				
	Success					13.05	2.24	.54	5.83***
	Empowerment					-5.16	1.64	-.29	-3.14**
Males									
Step 1		0.12	0.12	148	19.66***				
	Success					9.60	2.17	.34	4.43***

\*\*  $p \leq .01$ ; \*\*\*  $p \leq .001$

<sup>a</sup> Standardized coefficient  $\beta$

## Discussion

### *Research Questions 1, 2, and 3: Examining Differences by Sex and Course Type*

Men and women differed in their ratings of some components of the MUSIC model, but not in their ratings of their effort, the instructor, or the course. Specifically, women believed that the Personal Health course was more valuable (i.e., more useful and interesting) to them than the men, whereas men believed that the instructor showed a higher level of personal caring than did the women. I speculate that the women were more likely than the men to find some aspect of the health *content* more valuable. I base this assertion primarily on the research indicating that there are some differences in what females and males value. For example, females have been shown to be more interested than males in several topics included in the Personal Health course, including healthy eating, nutrition, genetics and reproduction, and AIDS (Baram-Tsabari & Yarden, 2009; Jones, Howe, & Rua, 2000). Researchers have also documented that undergraduate women are more interested than men in health promoting activities such as changing their dietary habits and levels of physical activity (Von Bothmer & Fridlund, 2005). I am unsure why the men believed that the instructor was more caring than the women. Perhaps the use of other research methods, such as conducting in-class observa-

tions or interviewing men and women, would lead to findings that could further explain these differences.

With respect to differences between face-to-face and online instruction, students in the online course provided higher ratings than students in the face-to-face course for empowerment, usefulness, situational interest, individual interest, personal caring, effort, instructor rating, and course rating. In examining why this might be the case, I speculate that students felt more supported by the instructor, which could be evidenced by the higher scores for empowerment and personal caring. An important follow-up to this finding would be to examine how the instructor interacted differently in the online course than in the face-to-face course and whether this could explain the higher values in the online course. I am unsure why students would find the course more useful or interesting online given that the content and textbook was the same in both courses. Perhaps the complementary activities available at the textbook website made the course appear to be more useful or interesting in some way. Students might have reported that they put forth more effort in the online course because they had to be completely self-regulated and work on their own without the external motivation of attending class. The finding that the instructor and course ratings were higher in the online course than the face-to-face course is consistent with the findings of some other studies that have documented higher ratings for students in online courses (e.g., Lim, Kim, Chen, & Ryder, 2008).

#### *Research Question 4: Investigating Relationships Among Variables*

Because it would be too cumbersome to discuss each of the correlations in Table 3, I will discuss the pattern of results that emerged. With only a few exceptions, all seven of the MUSIC model components were statistically, positively correlated with effort, instructor ratings, and course ratings. This finding demonstrates that the components of the MUSIC model are associated with student effort and what students judge to be “good” instructors and courses. One exception was that success was not correlated with men and women’s reported effort in the face-to-face course. The fact that almost all of the MUSIC components were related to students’ effort, but that not all components were related to achievement, is consistent with other researchers’ findings that some motivation constructs are more closely related to motivational factors than performance (Garcia & Pintrich, 1996). One possible explanation for this finding might be that although the MUSIC components increased students’ effort, that

increased effort was not directed in a manner that produced higher achievement. In other words, students might have been putting forth effort, but not using effective study strategies.

*Research Question 5: Predicting Effort, Instructor Rating, Course Rating, and Achievement*

The MUSIC components that predicted students' effort varied somewhat by sex and course type (see Table 4). Although these correlation analyses do not imply causation, it appears to be important for instructors to foster situational and/or individual interest in a course to increase students' effort. The only condition for which interest was not a significant predictor was for women in the online course. Instead, personal caring explained 25% of the variance in women's effort and usefulness explained another 6% of the variance. Because the factors that predicted women's effort were completely different for the face-to-face and online course, this difference should be explored further using other courses and possibly other research methodologies.

Finding out which of the MUSIC components predict the instructor and course ratings should be of interest to most instructors because merit pay and other rewards are often based on these ratings. Interestingly, there was consistency across sexes and course types in that academic caring was the best predictor of instructor ratings. These findings indicate that the instructor was rated higher when students believed that the instructor cared about their academic success. Examples of whether or not instructors care about students' academic success include things such as caring about how much they learned, wanting them to do well in the course, enjoying the act of helping them learn, and wanting them to do their best work. This finding is consistent with the results of Filak and Sheldon (2008) who reported that the construct "relatedness" (which measured a combination of instructor academic and personal caring) was the best predictor of instructor ratings.

The importance of caring might surprise some instructors and make others wonder what they can do to increase students' perceptions of their academic caring. Jones (2009) has provided some strategies that instructors can use to design instruction with a consideration of caring, but more research is needed to understand which strategies work best under what conditions. It would seem especially important to understand how caring is conveyed and interpreted in online courses. For example, Ferguson and DeFelice (2010) have documented that

the length of the online course can affect the communication with an instructor, which could certainly affect how caring students' perceive their instructor to be.

Situational interest was the best predictor of students' overall course rating. Other researchers have also documented the importance of interest in other types of courses, such as psychology courses (Remedios & Lieberman, 2008) and online military training courses (Artino, 2008). The importance of interest in predicting course ratings provides a contrast to the predictors for instructor rating. Whereas, academic caring was most predictive of instructor ratings, situational interest was most predictive of course ratings, which indicates that students use different criteria by which to evaluate instructors and courses. When rating the instructor, students appeared to consider more human elements such as caring. When rating the course, they considered whether they were interested in learning the material and how much they enjoyed the course. I do not want to minimize the contribution of situational interest in students' instructor ratings because situational interest was also a significant predictor of instructor ratings in three of the four conditions. However, it seems important to note that instructor and course ratings were best predicted by different MUSIC components.

The fact that situational interest, as opposed to individual interest, was a significant predictor of instructor and course ratings provides evidence that what instructors do in their courses can affect students' experiences in the course. I point this out because it contradicts the idea that if students are not interested in the course content when they enroll in the course, there is nothing an instructor can do to interest them. In contrast, instructors who create situational interest in a course appear to benefit from higher instructor and course ratings.

Clearly, success was the best predictor of achievement for students in the face-to-face course. These findings underscore the importance of students' perceptions of their competence related to the course material. Students who believed that they could learn the material and perform well in the course were more likely to do so than those who did not. These results are consistent with self-efficacy theory (Bandura, 1986, 1997), which predicts that students' judgments of their capabilities are related to their performance. Other studies have also documented that students' perceptions of competence explain the most variance in their achievement (Filak & Sheldon, 2008; Gao & Xiang, 2008).

## Conclusions and Implications

Based on the overall results, a few major findings related to the research questions stand out. First, although several similarities between sexes and course types (face-to-face and online) existed for the components of the MUSIC model, I documented many differences between the face-to-face and online course. Further research is needed to better understand why students in the online course rated many of the components higher than students in the face-to-face course. Second, situational interest was a significant predictor of effort, instructor rating, and course rating for all but two of the sex and course type conditions. In fact, situational interest was the best predictor of course rating for both sexes and course types. These results demonstrate the importance of situational interest with respect to how students perceive a course and suggest that instructors should attempt to design their instruction to maximize situational interest. Third, academic caring was the most important predictor of instructor rating for both sexes and course types. I find it interesting that academic caring is as important in an online course as it is in a face-to-face course. Researchers could build upon this result by examining how instructors can foster academic caring in an online course. Fourth, students' perceptions of success were the best predictor of their achievement. This result indicates that it is important for instructors to instill in students the belief that they can succeed in the course and learn the material. Finally, one of the largest disparities between the face-to-face and online course was that the significant predictors of effort for women in the face-to-face course (i.e., individual interest and situational interest) were completely different from the predictors for women in the online course (i.e., personal caring and usefulness). It would be useful to explore this difference further to determine whether this is true in other types of courses and how these differences might affect women's effort.

The general pattern of results from the correlation and regression analyses indicated that the components of the MUSIC model were significantly related to students' effort for both sexes and course types. Because some components were more highly related to effort than others, depending upon the sex and course type, all of the components are needed to better understand students' effort. These findings are consistent with Jones' (2009) explanation that when students report higher values on the components of the MUSIC model, they are more motivated to put forth effort to engage in learning. Because the components were also highly correlated with students' instructor and course ratings, I contend that the components

of the MUSIC model are worthy of further examination to anyone interested in students' effort, instructor ratings, or course ratings.

In sum, the findings suggest that to maximize students' effort and achievement, as well as their instructor and course ratings in both face-to-face and online courses, instructors should consider the components of the MUSIC model of motivation and ensure that their instruction: (a) empowers students by giving them control over their learning, (b) demonstrates the usefulness of the content to students' short- and long-term goals, (c) creates conditions in which students feel that they can succeed and meet the course objectives, (d) interests students by creating situational interest and developing their long-term interests, and (e) demonstrates that they care about students personally and whether or not they meet the course objectives. I hope that the findings from this study will encourage instructors to reflect on their teaching and whether or not they are attending to, and intentionally designing courses with, the components of the MUSIC model in mind.

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## Appendix

All items were rated on 7-point Likert type scales with end points as noted. Cronbach alpha reliability estimates ( $\alpha$ ) are provided for each scale in order of (1) females in the face-to-face course, (2) males in the face-to-face course, (3) females in the online course, and (4) males in the online course.

**Empowerment** ( $\alpha = .81, .85, .92, .91$ ; 1 = *strongly disagree*; 7 = *strongly agree*)

1. I felt understood by my instructor.
2. My instructor conveyed confidence in my ability to do well in the course.
3. My instructor encouraged me to ask questions.
4. My instructor listened to how I would like to do things.
5. My instructor tried to understand how I saw things.

**Usefulness** ( $\alpha = .88, .86, .94, .93$ ; 1 = *strongly disagree*; 7 = *strongly agree*)

1. What I learned in this course was relevant to my life.
2. I believe that the topics in this course were important for my future.
3. In general, the material in this course was useful to me.

**Success** ( $\alpha = .88, .84, .92, .86$ ; 1 = *very untrue*; 7 = *very true*)

During this course,

1. I felt confident in my ability to learn the material.
2. I was capable of learning the material.
3. I was able to achieve my goals.
4. I felt that I was able to perform well.

**Situational Interest** ( $\alpha = .88, .87, .90, .85$ )

1. How much did you enjoy participating in this course? (1 = *strongly disliked*; 7 = *enjoyed a lot*)
2. In general, how interested were you in learning the material in this course? (1 = *very uninterested*; 7 = *very interested*)
3. Overall, how much did you enjoy this course? (1 = *strongly disliked*; 7 = *enjoyed a lot*)

**Individual Interest** ( $\alpha = .80, .69, .89, .85$ ; 1 = *strongly disagree*; 7 = *strongly agree*)

1. Doing well on tasks in this course was very important to me.
2. Being successful in this course was very valuable to me.
3. It mattered to me how well I did in this course.

**Academic Caring** ( $\alpha = .84, .89, .94, .93$ ; 1 = *never*; 7 = *always*)

I believe that my instructor:

1. cared about how much I learned.
2. wanted me to do well in the course.
3. liked to help me learn.
4. wanted me to do my best work.

**Personal Caring** ( $\alpha = .83, .85, .92, .86$ ; 1 = *never*; 7 = *always*)

I believe that my instructor:

1. really cared about me as a person.
2. thought it was important to get to know me.
3. liked me as much as he/she liked other students.
4. cared about my feelings.

**Effort** ( $\alpha = .84, .84, .86, .84$ ; 1 = *very untrue*; 7 = *very true*)

1. I put a lot of effort into this course.
2. I tried very hard in this course.
3. It was important to me to do well in this course.
4. I put a lot of energy into this course.