

# **The Relationship Between Emotional Intelligence and Attitudes Toward Computer-based Instruction of Postsecondary Hospitality Students**

**Carl Behnke, Ph.D.**  
**James P. Greenan, Ph.D.**  
*Purdue University*

## **ABSTRACT**

*This study examined the relationship between postsecondary students' emotional-social intelligence and attitudes toward computer-based instructional materials. Research indicated that emotions and emotional intelligence directly impact motivation, while instructional design has been shown to impact student attitudes and subsequent engagement with content. Computer-based technology is widely used in teaching; however, inappropriate application of this technology is likely to result in less than acceptable outcome. In this study, the emotional intelligence of 92 students was assessed using Bar-On's EQ-i:S. Subsequently, students were directed to specific computer-based instructional methods; then their attitudes toward their respective method were assessed using Keller's Instructional Material Motivation Survey (IMMS). In general, students expressed a preference towards the interactive, non-linear, unstructured form of computer-based instruction; however, attitudes associated negatively with emotional-social intelligence for students identified as possessing low-average emotional-social intelligence. The findings and implications are discussed and recommendations for future practice and research are offered.*

## **Introduction**

There are many different instructional methods, for example face-to-face, self-directed, small-group, and mastery learning, each having different advantages, disadvantages, and applications. Concurrently, the use of computer-based technology for the delivery of educational content is growing rapidly. Computer-based technology permeates American society and education through instructional design, content, and delivery. According to the U.S. Census Bureau, computer ownership in the United States increased from 8% in 1984 to 61.8% of homes in 2003, with 54.7% of those homes also having access to the Internet. Additionally, more than 75% of households with school-aged children had computers, while 67% also had Internet access. At school, 92.3% of secondary students and 85% of adult students used computers in their studies. Further, 66% of adult students reported Internet access through their school (Day, Janus, & Davis, 2005). Given this level of saturation and the fact that comparing the effectiveness of traditional face-to-face delivery methods with computer-based methods has been well studied, some researchers have suggested that research should move from comparing techniques to evaluating the benefits and effectiveness of educational technology on its own merits (Feinstein, Raab, & Stefanelli, 2005).

One current educational trend focuses on integrating computer-technology into instructional design and delivery, one challenge for researchers is to explore the various models of integration, examining them with regard to their unique strengths, limitations, utility, and

acceptability for students, instructors, and institutions alike. This poses a particular challenge – that of matching students’ learning styles and personal characteristics, such as emotional intelligence, with appropriate instructional design and methods. Appropriate instructional design will consider specific student needs prior to determining appropriate educational methods. Student needs, in terms of personal characteristics, preferences, and specific program requirements must be assessed and are instrumental in determining appropriate instructional techniques. Accordingly, research examining the defining parameters for appropriate applications of technology, including the requirements and nature of the student, the needs of the course instructor, the nature of the course content, and technological constraints, is warranted. Determining the relationship between emotional intelligence and the motivation to use computer-based materials provides guidance with respect to matching appropriate instructional materials and methods with the learner’s needs and characteristics.

### **Purpose and Objectives of the Study**

The purpose of this study was to examine the relationship between emotional-social intelligence and students’ attitudes toward computer-based instruction; accordingly, the following objectives guided this study:

1. To assess the emotional-social intelligence of postsecondary students.
  2. To assess students’ attitudes toward self-directed, computer-based instructional materials and methods.
  3. To determine the relationship between students’ emotional-social intelligence and attitudes toward self-directed, computer-based instructional materials and methods.
- Access to, and comfort with, technology was a prerequisite for participation in this study.

Students were expected to have current and reliable hardware, software, and Internet access. Study components were hosted within a password-protected, Web-based instructional platform.

Instruments designed to measure personality traits included surveys of emotional-social intelligence and motivational ability of instructional materials and methods. Both instruments were self-report instruments and, therefore, potentially subject to bias. In order to eliminate, or at least reduce possible bias, instruments with adequate reliability and validity were selected.

Intrinsic emotional intelligence, as characterized by abilities in areas such as intrapersonal and interpersonal relationships, personal stress management, adaptability, and general personality, was assumed to impact scholastic performance, specifically, in activities requiring a high degree of self-motivation, self-direction, and independent study, frequent characteristics of e-learning delivery methods. The assumption was that students who possessed relatively low emotional-social intelligence would have more difficulty with these self-directed educational elements due to procrastination and lack of guidance, and would rate the motivational aspects of computer-based instructional media and methods less favorably than traditional face-to-face techniques due to the perception of increased effort and corresponding lack of self-confidence. It was also assumed that students with relatively high emotional-social intelligence would navigate the requirements associated with e-learning quite readily due to their intrinsic self-discipline and positive attitude, and would likely rate the motivational aspects more

favorably than the traditional techniques due to the advantages of asynchronous, self-directed nature of computer-based instruction.

## **Review of the Literature**

### **Computer-based Instruction**

Multiple studies have supported the impact of e-learning. For example, Krentler and Willis-Flurry's (2005) study on the influence of online discussion boards on student learning concluded that technology did "enhance student learning" (p. 321), while Tjaden and Martin's (1995) study of a college level mathematics course found no significant difference in learning. These findings support Sivin-Kachala and Bialo (1994) whose meta-analysis reported that educational technology stimulated interactive teaching and motivated students, while enhancing achievements and attitudes toward learning. More recently, research comparing distance or online learning with traditional delivery methods found that online students learned as much as traditionally taught students (Behnke & Ghiselli, 2004; Summers, Waigandt, & Whittaker, 2005; Warren & Holloman, 2005). Schacter (1999) reported that students with access to computer-assisted instruction in various forms demonstrated positive test improvement. Oblinger, Barone, and Hawkin (2001) asserted that distributed education can provide an enhanced learning experience in terms of interaction, collaboration, and student flexibility. Studies into blended instruction revealed increased motivation and engagement with increased course performance as compared to classroom learning (Klein, Noe, & Wang, 2006). Lastly, researchers found that an advantage of computer-based instruction was its ability to deliver consistent messages to each student (Costello, Gaddis, Tamplin, & Morris, 1997; Harris & Bonn, 2000) over a large geographical area in a cost-effective fashion (McLellan, 1998).

E-learning does have its challenges. Summers et al (2005) found that participants were less satisfied with the online experience, while Warren and Holloman (2005) recommended that more research should be conducted on online course delivery and related student/societal impact. Thompson and Lynch (2003) found that students uncomfortable with their abilities at using the Internet were generally opposed to online courses and that inadequate equipment can contribute to this opposition. Haugen, LaBarre, and Melrose (2001) also noted the need for comprehensive computer skills with respect to appropriate equipment access and the associated operational requirements. Without this competence, there is the potential for negative motivation leading to underperformance and dissatisfaction with the course.

Oblinger et al (2001) indicated that some of the teaching challenges associated with distributed learning required adequate faculty and student support as well as new approaches to teaching and learning. Haugen et al (2001) noted that "online course planning and delivery can consume very large blocks of instructor time" (p.128), and that continuous training is required to either get the instructors prepared, or to keep them up-to-date with technological innovations. They reported other limitations such as student isolation and lack of social environment, challenges in providing adequate faculty-to-student feedback, and issues of academic fraud.

The advantages associated with the computer-based method of content delivery seem to be that when designed and applied appropriately, it offers a consistent, asynchronous, adaptive,

flexible, and economic form of delivery, albeit, with some limitations and constraints. However, delivery is only part of the academic equation. The act of teaching requires engagement on the part of the student. The best teacher with well developed course materials and delivery mechanisms can still fail in the absence of student engagement. Engaging students requires an understanding of personal characteristics, such as needs and desires, as well as an understanding of the emotions and motivations that compel their behaviors. An intrinsically motivated student is likely to learn regardless of the instructional media or method. Such a student will find a way to adapt to a particular learning style; however, an unmotivated, unengaged student will make little effort to learn. Long-term educational achievement is impossible without motivation inspiring engagement, scaffolding, and internalization. Emotional intelligence and its relationship to motivation and subsequent academic success, therefore, deserve examination.

### **Emotional Intelligence and Motivation**

Defining emotional intelligence is difficult; however, a synthesis of research (Plutchik, 2001; Salovey & Mayer, 1990; Pekrun Geotz, Titz, & Perry, 2002; Astleitner, 2004; Fredrickson, 2004; Bar-On, 2006) offers this: *A measure of one's ability to use acquired knowledge, abstract thinking, and problem solving to interpret and guide personal responses to significant internal and external situations.*

Landau (1998) noted that self-perception enables a person to control forms of thought, emotion, impulse, and satisfaction, and that one's abilities in this regard result from a comprehensive personality, the self. Emotional maturity, a concept related to emotional intelligence, is defined as a person's strength at realizing their individual abilities within a social framework, and plays as much a role in the formation of self-perception as intellectual maturity (Landau, 1998). Bar-On (2006) emphasized the importance of self-actualization, which he defined as achieving one's potential in terms of abilities and talents, leading to an enriched life. This skill requires a strong sense of self-awareness and personal understanding. It also requires good problem solving skills and an assertive confidence for following through with tasks. Research into the concept of emotional intelligence suggested that characteristics such as self-perception, maturity, and self-actualization were motivating forces that lead to engaged students and corresponding academic and career success (Ainley, 2004; Bar-On, 2006; Landau, 1998; Cherniss, 2000; Davies & Stankov, 1998).

Furthermore, Pintrich and DeGroot's (1990) study into self-regulated learning found that student involvement was closely linked to their efficacy beliefs in their ability to complete tasks, and their belief that said tasks were both interesting and worthwhile; however, they also suggested that self-regulated strategies, such as goal-setting, planning, effort management, and persistence, were even more directly linked to performance, which supports Cherniss (2000), who suggested that emotional intelligence by itself may not be a strong predictor of job performance, rather, it may be the basis for "competencies" that are strong predictors. Therefore, abilities in the realm of emotional intelligence lead to skills and abilities that can predict job performance. At the same time, Davies and Stankov (1998) concluded that objective measures of emotional intelligence demonstrate significant overlap with traditional personality measures, and cautioned that use of self-report instruments can be problematic.

Emotional intelligence is difficult to define and measure as a concept; however, it has been the subject of significant debate and research. While a consensus has not been achieved, it does seem that, as Cherniss (2000) noted, sufficient research exists to suggest that the ability to perceive, identify, and manage emotions is foundational to developing the social and emotional competencies needed for career success. These competencies will become more important in a changing world of work that demands additional cognitive, emotional, and physical resources. Mastering these competencies will require learner motivation, which fosters engagement.

Motivation is driven by an individual's emotions and can be either positive or negative in nature (Palladino & Bloom, 2008; Pintrich, 2003). Lack of motivation is one of the possible causes of attrition in e-learning courses, in addition to the lack of consideration for learner support (Thorpe, 2002) and learner personality issues (Martinez, 2003), as well as limited learner control, student isolation, and self-doubt (Keller, 1999). Song and Keller (2001) reported that the appeal resulting from the novelty and variety associated with technology tended to disappear with familiarity, and excessive or unnecessary motivational tactics could be demotivating to an already motivated learner. Researchers have noted that e-learning requires greater self-discipline, self-direction, and maturity from students, which may also explain why e-learning programs experience higher dropout rates (Chen & Jones, 2007; Diaz, 2002; Martinez, 2003; Zhang, Zhao, Zhou, & Nunamaker, 2004). Zhang et al (2004) indicated that poorly designed and implemented e-learning systems could lead to student boredom and disengagement, while Faryadi (2007) stated that innovative and entertaining instructional materials were insufficient to provide motivation; relevance was required. Martinez (2003) identified personal ability; academic, familial, and financial issues; course dissatisfaction; lack of direction and relevance; employment conflicts; and instructors as factors that contribute to e-learner attrition.

Emotion and motivation each share the Latin root of *movere*, meaning "to move" (Palladino & Bloom, 2008). It seems clear that emotions are, in part, a significant driving force behind motivation; they work together to *move* students in a particular direction. Students who are uninspired emotionally by content and delivery may lack the motivation to engage and, therefore, learn to their fullest ability. Students with relatively immature levels of emotional intelligence may be predisposed to perceive online learning negatively, since success in this environment demands greater degrees of self-discipline, independent effort, maturity, time management skills, and positive attitudes. Given research that links performance in e-learning venues to intrinsic personal characteristics such as self-discipline, self-direction, and maturity, as well as to extrinsic motivators, such as instructional design, course instructor and perceived relevance, research into the relationship between attitudes toward computer-based instruction and emotional intelligence is warranted.

## **Methodology**

This study examined the relationship between intrinsic and extrinsic motivation with respect to emotional intelligence and student attitudes toward instructional design. Emotions and emotional intelligence impact motivation directly; therefore, emotional intelligence can be considered related to intrinsic motivation. Extrinsic motivations, as Pintrich (2003) noted, tend to reflect behaviors prompted by external reasons or values. Since instructional design has been shown to impact student attitudes and subsequent engagement with content, student reactions

toward instructional design methods could be considered related to extrinsic motivation. Given the potential of computers in contemporary society, an examination of these relationships in an e-learning design environment was justified.

## **Theoretical Framework**

The theoretical frameworks supporting this study include Bar-On's competency-based model known as Emotional-social Intelligence (ESI) from the field of psychology, and Expectancy-value Theory as originally proposed by Vroom (2005), adapted by Porter and Lawler, and operationalized by Keller (1983). ESI was grounded in research encompassing inter- and intrapersonal intelligence, social intelligence and socially competent behaviors, and research into the ability to recognize emotions (Bar-On, 2006).

Bar-on's Emotional Quotient Inventory (EQ-i) was developed to measure ESI. It is a 133 item self-report questionnaire designed to examine five scales including (a) intrapersonal, (b) interpersonal, (c) adaptation, (d) stress management, and (e) general mood (McEnrue & Groves, 2006). Research suggests that the instrument possesses good reliability, validity, and predictive ability (Bar-On, 2006; Cherniss, 2004; Dawda & Hart, 2000; Dulewicz, Higgs, & Slaski, 2003). However, some researchers argue that there is little support for the claim that ESI could predict academic, life, and employment achievement (Newsome, Day, & Catano, 2000; Van Rooy & Viswesvaran, 2004), and note that it may be more effective at measuring personality traits (O'Connor & Little, 2003). There has been much discussion about the utility of emotional measures, such as the EQ-i; however, given that the instrument does possess adequate validity (Parker, Creque, et al., 2004; Parker, Summerfeldt, Hogan, & Majeski, 2004), it was possible that these issues could merely reflect the complexity involved in the conceptualizing and measuring emotional intelligence as suggested by Cherniss (2004).

The EQ-i scores were used solely to divide the sample population into groups of high and low emotional intelligence; therefore, the 51-item short version, EQ-i:S, was deemed adequate. It focuses upon four key dimensions of the EI construct: intrapersonal, interpersonal, adaptability, and stress management abilities. The reliability coefficients of the total EQ score (short version) range from 0.91-0.93 for males and 0.92 for females across all age groupings. The standard error of measurement for people between 16-29 years of age is 1.58 for males and 1.60 for females (Bar-on, 2002). Following are question examples reprinted with the permission of the instrument administrator:

- My approach in overcoming difficulties is to move step by step.
- It's hard for me to make decisions on my own.
- Before beginning something new, I usually feel that I'll fail.

Expectancy-value theories fall within the classification of growth theories of motivation, arguing that behaviors are motivated according to an expectancy of success in relation to the perception of value. Expectancy-value Theory, as originally posited by Vroom, holds that outcomes may possess inherent valence or else derive valence from perceived utility (Vroom, 2005). Porter and Lawler's variant of Vroom's theory was the driving concept for Keller's Model of Motivational Design, links persons' motivations to engage in an activity with

perceptions of how it matches their personal needs (value), and the degree to which they expect to succeed (expectancy) (Keller, 1983). Keller's model, commonly referred to as ARCS, asserts that four general requirements must be satisfied to motivate people to learn: **Attention, Relevance, Confidence, and Satisfaction.**

Research supports the use of Keller's Model of Motivational Design for computer-based instructional design (Huang, Diefes-Dux, Imbrie, Daku, & Kallimani, 2004; Song & Keller, 2001); however, with some contextual adjustments (Huang, et al., 2004). Research has found that student motivation, performance, and self-directed learning can be effectively improved when systematically designed around the ARCS model (Gabrielle, 2003), and that the model does offer a feasible approach to examining students' motivational issues related to computer-based instruction (Huang et al, 2004). Keller's Instructional Material Motivational Survey (IMMS) was designed to examine extrinsic motivations associated with self-directed, computer-based instructional design. The IMMS is a post-treatment, self-report survey that is situational-specific and designed to measure a "student's motivational reactions to self-directed instructional materials" (Keller, 2006). Following are question examples reprinted with permission of the instrument's author:

- This material was more difficult to understand than I would like for it to be.
- Completing this lesson successfully was important to me.
- This lesson was not relevant to my needs because I already knew most of it.

The IMMS is scored on four subscales and one total scale with a minimum response of 36 and a maximum response of 180 (Keller, 2006). Keller (2006) reported that the IMMS has internal consistency reliability estimates for each scale: Attention, 0.89; Relevance, 0.81; Confidence, 0.90; Satisfaction, 0.92; and Total Scale, 0.96; therefore, the instrument was considered to possess adequate reliability.

## **Research Questions**

This was a descriptive study designed to explore the relationship between students' emotional intelligence and their acceptance of materials and methods delivered in computer-based contexts. The following research questions were, therefore, posited for this study:

1. Is there a significant ( $p < 0.05$ ) positive relationship between EQ-i scores and IMMS scores for postsecondary students identified with high emotional-social intelligence (HEQ) in the non-linear, unstructured computer-based instructional method (HCBI)?
2. Is there a significant ( $p < 0.05$ ) negative relationship between EQ-i scores and IMMS scores for postsecondary students identified with low emotional-social intelligence (LEQ) in the non-linear, unstructured computer-based instructional method (HCBI)?
3. Is there a significant ( $p < 0.05$ ) positive relationship between EQ-i scores and IMMS scores for postsecondary students identified with low emotional-social intelligence (LEQ) in the linear, structured computer-based instructional method (LCBI)?
4. Is there a significant ( $p < 0.05$ ) negative relationship between EQ-i scores and IMMS scores for postsecondary students identified with high emotional-social intelligence (HEQ) in the linear, structured computer-based instructional method (LCBI)?

## Population and Sample

The population for this study was all hospitality students in one major Midwestern university. The sample was comprised of ninety-two students, predominantly sophomores and juniors, enrolled in a quantity food production course. The study was conducted twice, once in fall 2008 and again in spring 2009. Approximately one month prior to the instructional treatments, the EQ-i:S paper and pencil self-report instrument was administered.

The EQ-i:S response sheets were sent to Multi-Health Systems (MHS), the instrument administrator, for scoring. Scored data set reports were returned, identifying each respondent, age, gender, and item response patterns, as well as raw and standardized scores for each scale, and the total EQ score. Bar-On (2002) noted that the EQ-i:S uses standardized scores with a mean of 100 and standard deviation of 15. The results were grouped into 7 categories: (a) markedly high (130+), (b) very high (120-129), (c) high (110-119), (d) average (90-109), (e) low (80-89), (f) very low (70-79), and (g) markedly low (under 70). As Bar-On (2002) noted, these categories are guidelines and there may not be a meaningful difference between a standardized score of 119 and a standardized score of 120. In order to ensure a relatively even distribution of subjects by emotional intelligence level, the mean of the average grouping, 99.5, was used to divide subjects into groups of high (HEQ) and low (LEQ) emotional social intelligence. Students in each group were assigned proportionately and randomly to one of the three treatments: (a) lecture; (b) linear, structured CBI (LCBI); or (c) non-linear, unstructured CBI (HCBI). Students were not informed of their assigned group until the day of instruction.

## Data Collection

Keller's IMMS survey was collected after each respective lesson and in a manner appropriate to the nature of the delivery. Participants in both the structured and unstructured CBI treatments were given a deadline to complete the lesson. Since a component of this research was intended to examine participants' self-discipline and ability to work independently, no other deadlines were specified. The study was conducted twice, in the fall of 2008 and in the spring of 2009.

All groups were exposed to parallel lessons grounded in the culinary topic of stocks, soups, and sauces, pragmatic foundational content introduced during this required course. Specific learning objectives of this course involved fundamental cooking methods, culinary terminology, and related basic food handling skills. An Institutional Review Board (IRB) educational exemption was approved for this study. Students were not rewarded in any manner for their participation. They were, however, assured of confidentiality and informed that the content would be assessed as a regular part of the course.

Lesson content was refined from a pilot test conducted with a convenience sample of students enrolled in a prior semester's course. The lesson was developed in accordance with Keller's ARCS principles utilizing slides, videos, prior course content, and assigned textbook readings, and distributed to two professional chefs for examination of content accuracy and clarity. Expert feedback was used for revision, after which a pilot test was conducted.

Following the pilot test, students were surveyed on the presentation's effectiveness. This feedback was used for final revisions, after which the lesson was considered complete and adequate, and used as the basis for the two forms of computer-based delivery.

Two instructional strategies were examined in this study: (a) linear, structured CBI (LCBI); and (b) non-linear, unstructured CBI (HCBI). Two forms of CBI were used to examine whether attitudes toward computer-based, self-directed instruction varied with the nature of the delivery method.

The second group experienced a linear, structured form of CBI (LCBI) consisting of the same PowerPoint presentation. This presentation most closely resembled a lecture except for the fact that it was hosted online and available asynchronously. Each slide was timed and synchronized with audio elaboration, and packaged as an online lecture. Students in the LCBI group could only move back and forth through the presentation until the point where they began the review quiz (see Figure 1). A corresponding handout was provided and also posted online for downloading, if desired. Once the review quiz was completed, students were directed to complete the IMMS online survey.

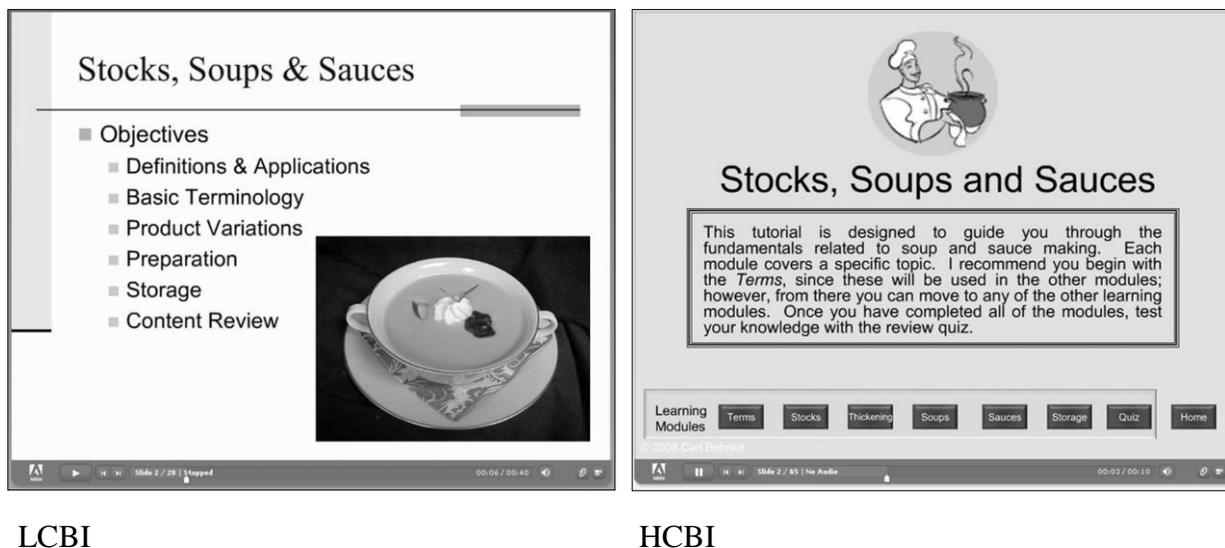


Figure 1. Computer-based Instructional Page Screenshots

The second group experienced a non-linear, unstructured form of CBI (HCBI), formatted as an interactive computer-based tutorial. Using the same content from the LCBI tutorial, the material was broken into distinctive interactive components that encouraged students to freely move through the tutorial and self-determine the nature and makeup of their own lesson. For example, a student could choose to begin with a module of terminology, or alternatively, the video module, and they could repeat any module (see Figure 1). A corresponding handout was provided and available online. Once the review quiz was completed, students were directed by hyperlink to the IMMS online survey.

Students assigned to each CBI group were escorted to labs equipped with Internet-ready computers and audio headsets. Coordinators demonstrated how to access and operate the instructional module, after which the students were released. Those who desired to proceed with the lesson were free to do so. Those who desired to depart and complete the lesson later were also free to do so in accordance with the asynchronous, self-directed nature of computer-based instruction. Both groups commenced simultaneously and viewed a short video designed to generate interest and gain the students' attention, as recommended by Keller.

## **Data Analysis**

For purposes of data analysis, the variables included the EQ-i and IMMS scores. Students were divided by high and low emotional intelligence as measured by the EQ-i, and then assigned randomly to a group. The groups included structured CBI (LCBI) and self-directed CBI (HCBI). The IMMS data were collected after each group completed the respective delivery method. The data were compiled into appropriate formats for statistical analysis. All analyses were conducted using SAS® Systems software.

Chi-square was used to verify the independence of the data and provide a basic overview of the sample. ANOVA procedures examined differences in attitudes towards instructional method. Potential relationships between attitudes and emotional intelligence scores were examined via correlation, and regression techniques were used to determine the size, strength and direction of any relationships.

## **Findings**

The focus of this study was to determine if students with high emotional-social intelligence (HEQ) demonstrated a preference for non-linear, unstructured computer-based instruction (HCBI). The underlying assumption was that students would possess greater abilities with respect to self-discipline, persistence, time management skills, and positive attitudes, abilities that have been related to success in computer-based instructional environments (Aragon, Johnson, & Shaik, 2002; Diaz, 2002; Martinez, 2003; Powell, Conway, & Ross, 2007). Conversely, this study also intended to determine if students with low emotional-social intelligence (LEQ) demonstrated a preference for the linear, structured computer-based instructional method (LCBI). The underlying assumption was that students would possess lesser degrees of those same intrinsic abilities and would, therefore, be less confident and positive when exposed to methods that require learners to self-determine the direction, nature, and scope of instruction.

One hundred fifty-eight students were enrolled in the course over the two semesters. Of these, 92 participated and fully completed the study. Additionally, there were several issues of response bias associated with the EQ-i:S that required the elimination of six students. Adjustment resulted in a combined sample size of 86 students, with 64 females and 22 males distributed through the two instructional groups (see Table 1).

**Table 1***Sample Distribution by Gender and Instructional Group*

Instruction	Female	Male
LCBI (n=45)	N = 31 Mean ESI = 104.16 ( <i>SD</i> = 8.51) Mean IMMS = 125.84 ( <i>SD</i> = 23.07)	N = 14 Mean ESI = 95.29 ( <i>SD</i> = 10.21) Mean IMMS = 119.79 ( <i>SD</i> = 19.70)
HCBI (n=41)	N = 33 Mean ESI = 100.64 ( <i>SD</i> = 15.04) Mean IMMS = 129.48 ( <i>SD</i> = 16.89)	N = 8 Mean ESI = 103.63 ( <i>SD</i> = 14.38) Mean IMMS = 138.5 ( <i>SD</i> = 19.89)

*Note.*

HCBI = Non-linear, Unstructured Computer-based Instruction.

LCBI = Linear, Structured Computer-based Instruction.

ESI = Total Emotional-social Intelligence Score

IMMS = Total Instructional Materials Motivational Survey Score

### Relationship between Attitude and Emotional-social Intelligence

Chi-square analyses indicated that 60.47% (n=52) of the sample possessed average to high emotional-social intelligence (HEQ) and 39.53% (n=34) of the sample possessed low to average emotional-social intelligence (LEQ) (see Table 2). The Chi-square value of 0.1219 ( $p = 0.7270$ ) revealed that there were no differences between the frequencies for emotional-social intelligence, indicating adequate randomization between instructional groups. Frequency comparison of emotional-social intelligence by gender was also not significant  $X^2(1, N = 86) = 1.3544, p = 0.2445$ , meaning there were no significant differences between high and low emotional-social intelligence by gender as distributed between instructional methods, confirming adequate randomization.

Chi-square analyses validated the data in terms of independence; however, they also highlighted the unequal cell sizes, with more females than males, and more students with average-high, emotional-social intelligence (HEQ) than those of low-average (LEQ) classification. Therefore, it was necessary to further validate the data in terms of assumptions of normality and homogeneity of variance. When examined by instructional method, emotional-social intelligence and attitude scores appeared normally distributed. These distributions were verified by the Shapiro-Wilk test for normality, which were not significant at the  $p = 0.05$  level of significance. However, when the data were further subdivided by instruction and gender, it appeared that the attitudes of females assigned to the non-linear computer-based instruction group (HCBI) were not normally distributed ( $w = 0.927, p = 0.028$ ). This was likely the result of influential outliers, in contrast to the other groups and gender, which were normally distributed. When emotional-social intelligence was examined by instruction and gender, scores appeared normally distributed, as verified by the Shapiro-Wilk test for normality.

Overall, the data satisfied the assumptions of independence and normality. However, the assumption of normality may be impaired when subdividing the data. Assumptions pertaining to

variance were assessed using Levene's test for homogeneity of variance and with residual plots during regression. Deviations from the assumptions could be due to the unbalanced nature of the sample especially when examined by gender and instruction, as well as potential outliers. Due to the sample's unbalanced nature, the general linear model (GLM) process with the Tukey-Kramer adjustment for multiple comparisons was considered appropriate for examining differences.

The purpose of this study was to examine potential relationships between emotional-social intelligence and attitudes toward computer-based instruction. Since ANOVA detected no significant differences,  $F(1, 84) = 1.75, p = 0.190$ , between male and female emotional-social intelligence, further examination of the data subdivided by gender was deemed unnecessary and unlikely to yield useful or reliable data. The most relevant and reliable analyses were those concentrating on instructional method and emotional-social intelligence, because they directly addressed the research questions.

Preliminary analyses suggested the possibility of outliers on both the y-axis (leverage points) and on the x-axis (outliers); therefore, the robust regression procedure using the LTS estimate was applied to confirm the presence of influential observations (Chen, 2002). Robust regression identified four leverage points and one outlier within the HCBI group, and two leverage points within the LCBI group. Interestingly enough, six of the seven observations were from students who had been identified as having emotional intelligence below the mean (99.5) total score of Bar-On's average category (LEQ). The seventh observation had a total ESI score of 104, just marginally above the 99.5 breakpoint. The presence of outliers can unduly influence the overall results. Specifically, correlation coefficients are very susceptible to outliers with respect to small sample sizes (Cody & Smith, 2006). Therefore, it was decided to examine the key analyses excluding outliers and leverage points, thus reducing the overall sample size by seven, with the understanding that this was a study limitation.

One-way ANOVA of attitude towards computer-based instruction indicated that differences in mean attitude between linear (LCBI) and non-linear (HCBI) computer-based instructional methods was significant,  $F(1,75.34) = 4.01, p = 0.0489$ . Graphs of attitude by instructional method revealed a greater dispersion in the LCBI group. This suggested that the interactive, HCBI form of computer-based instruction was received more positively than the linear, structured form of computer-based instruction (LCBI) (see Table 2).

**Table 2**

*Summary of Results*

ANOVA of Attitudes towards Instruction Type (LCBI / HCBI)
$F(1, 75.34) = 4.01, p = 0.0489 *$
Correlation of Maturity and Attitude
HCBI $r_s(34) = 0.0725, p = 0.6745$
LCBI $r_s(41) = 0.1296, p = 0.4075$

---

### Correlation of Maturity and Attitude by Instruction and Emotional Category

---

HEQ/HCBI  $r_s(21) = -0.0563, p = 0.7985$   
LEQ/HCBI  $r_s(11) = -0.6740, p = 0.0115 *$   
HEQ/LCBI  $r_s(26) = 0.0903, p = 0.6477$   
LEQ/LCBI  $r_s(13) = 0.3801, p = 0.1622$

---

### Regression of ESI on Attitude by Instruction Type and Emotional Category

---

HEQ/HCBI  $R^2 = 0.0005, F(1, 21) = 0.01, p = 0.9185$   
LEQ/HCBI  $R^2 = 0.4051, F(1, 11) = 9.00, p = 0.0121 *$   
HEQ/LCBI  $R^2 = 0.0102, F(1, 26) = 0.27, p = 0.6087$   
LEQ/LCBI  $R^2 = 0.1295, F(1, 13) = 1.93, p = 0.1876$

---

### Regression of Maturity on Attitude for Combined Groups

---

$R^2 = 0.02, F(1, 77) = 1.49, p = 0.2265$

---

### Regression of Maturity on Attitude

---

HCBI  $R^2 = 0.00, F(1, 34) = 0.05, p = 0.8329$   
LCBI  $R^2 = 0.04, F(1, 41) = 1.69, p = 0.2011$

---

\* Significant at  $p < 0.05$

Examination of attitudes toward respective instructional methods for each emotional-social intelligence category (HEQ/LEQ) identified no significant differences in means; however, graphs revealed that most of the variance in attitude within the LCBI group stemmed from the LEQ student responses. The fact that there were no significant differences between student attitudes toward respective computer-based instructional methods suggested that students perceived the two computer-based instructional methods to be equivalent with respect to their motivational nature as measured by Keller's IMMS. The graphs revealed a more consistent and positive response to the HCBI method in general, and a greater disagreement among LEQ students in the LCBI method.

Using total EQ scores and total IMMS scores as continuous variables allowed an examination of potential correlations. Given that normality and variance assumptions were marginal as the data were subdivided, it was decided that the data would be treated as nonparametric data and that Spearman correlation coefficients would be most appropriate. Again, the data were examined overall, and then by instructional method and emotional category.

Examination by instructional group and emotional category found a significant correlation. Students classified as low-average in terms of emotional-social intelligence (LEQ), who participated in the unstructured, non-linear computer-based lesson (HCBI), reported a significant, and moderate negative correlation between emotional-social intelligence and attitude,  $r_s(11) = -0.6740, p = 0.0115$ . No significant correlations were found for LEQ students in the LCBI method or for students classified as average-high emotional-social intelligence (HEQ) in

either the LCBI or HCBI method. Correlation findings seemed to indicate that, in general, LEQ students were not favorably disposed towards the non-linear, unstructured form of computer-based instruction (HCBI). However, these results need to be considered with caution given the sample size variations and the small correlation coefficients.

Simple linear regression of emotional-social intelligence and attitude for each emotional category and instruction confirmed the correlation finding for LEQ students assigned to the HCBI method,  $R^2 = 0.4051$ ,  $F(1, 11) = 9.00$ ,  $p = 0.0121$ . The coefficient of determination revealed that over 40% of variance in attitude was explained by emotional-social intelligence. Further regression analysis did not reveal anything of significance (see Table 2).

It should be noted, however, that the data collected during the first round of the study was potentially compromised. On the day the study began, the online course management system experienced serious issues resulting in the system going offline throughout the day. This did not become apparent until the students were escorted to their respective computer labs for the instructional plan demonstration. As a result, the coordinators were unable to access or demonstrate the course materials, and the students could not log into the course management site to begin the instructional plan. Access was restored later that day; however, it can be assumed that student attitudes toward computer-based instruction might be depressed artificially as a result. For this reason, an ANOVA contrasting the means of students' attitudes in each instructional group between fall and spring was performed. The findings indicated that there was no significant difference between the mean attitudes of students from the two semesters  $F(1, 77) = 0.07$ ,  $p = 0.7949$ ; however, graphs suggested that there was greater dispersion in the fall scores, possibly reflecting student concerns resulting from the technological challenges.

The main question for this study was whether or not there were relationships between relative levels of emotional-social intelligence and attitudes toward two different forms of computer-based instruction. Analyses were inconclusive for HEQ students in either instructional method and LEQ students for the LCBI method; however, the negative correlation between LEQ student attitudes and emotional-social intelligence for the HCBI method was significant.

One final analytical procedure was used to directly address this question. Analysis of variance of the attitudes by emotional category were not significant, suggesting that there were no differences in the means for attitudes toward either form of computer-based instruction when examined by the emotional-social intelligence category (HEQ/LEQ). However, these results could be problematic given the issues related to unequal cell sizes, lack of equality of variance, and normality as the data were subdivided. Box plots suggest graphically such a relationship.

The box plot of attitude by emotional category for the HCBI method revealed that the means were not significantly different  $F(1, 34) = 1.90$ ,  $p = 0.1770$ ; the mean attitude for students with high emotional-social intelligence (HEQ) was higher with marginally less variance ( $N = 23$ ,  $M = 135.26$ ,  $SD = 15.67$ ) than for students with low emotional-social intelligence (LEQ) ( $N = 13$ ,  $M = 127.69$ ,  $SD = 16.11$ ), suggesting that HEQ students were slightly more favorably disposed towards the HCBI instructional method than were the LEQ students (see Figure 3).

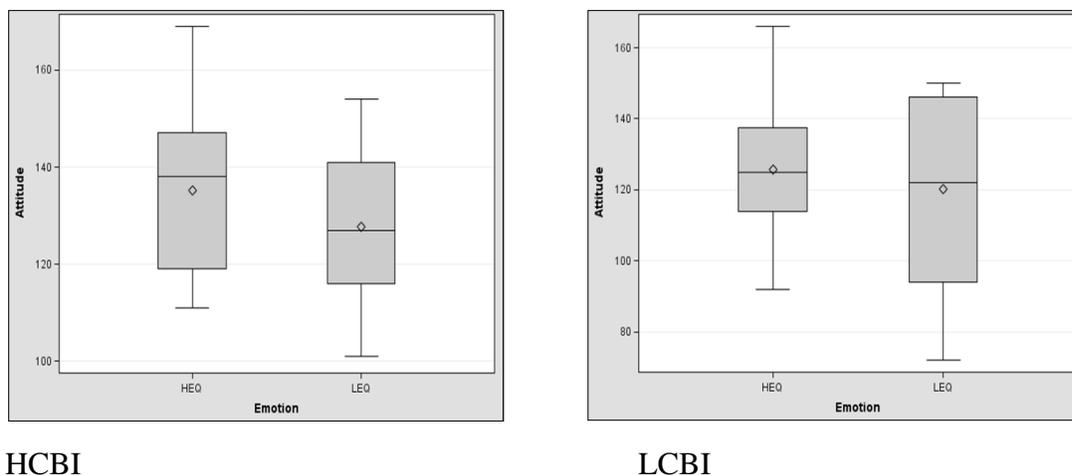


Figure 3. Box Plot of Means for Attitude towards Instructional Method by ESI

The box plot for the linear, structured computer-based instruction (LCBI) reflected the non-significant difference between the means for attitude  $F(1, 41) = 0.59, p = 0.4467$ ; however, in this case, the mean for HEQ students was marginally higher ( $N = 28, M = 125.79, SD = 19.65$ ) with almost significantly different variance according to Levene’s test  $F(1, 41) = 3.59, p = 0.0652$  than the mean for LEQ students ( $N = 15, M = 120.27, SD = 27.05$ ). This suggested that students in either emotional category were equally inclined towards the LCBI method; however, HEQ students were more consistently disposed towards the LCBI method than the LEQ students who revealed a large degree of variation in their attitudes toward the LCBI method (See Figure 3).

Sorting the sample into categories of low-average and average-high emotional-social intelligence as measured by EQ-i:S was done to ensure an even distribution of emotional intelligence between both instructional methods. However, Bar-On (2002) divided the standardized scores into seven generalized categories ranging from Markedly low (below 70) to Markedly high (above 130). This scale was not used for this study because the distribution was so disparate. For example, the majority of the students were in the average category (score range 90-109,  $N = 55$ ), compared to the low category (score range 80-89,  $N = 3$ ) and very low category (score range 70-79,  $N = 1$ ). For this reason, it was decided that analyzing this sample using Bar-On’s categories would not have yielded useful results.

### Conclusions, Implications, and Recommendations

The purpose of this study was to examine the relationship between emotional intelligence and attitudes toward self-guided instructional materials of postsecondary students. The first research question focused on HEQ students assigned to the HCBI method. It was assumed that students possessing high levels of emotional-social intelligence would prefer this method due to its self-directed nature. The findings indicated that there was no significant relationship between emotional-social intelligence and attitude; however, the HEQ students were more favorably disposed towards the HCBI method than LEQ students. The answer to the first research question was, therefore, inconclusive.

The second research question addressed LEQ students in the HCBI method. The assumption was that students identified with low-average emotional-social intelligence would not prefer this method due to its self-directed nature. The findings indicated that there was a significant negative relationship between emotional-social intelligence and attitudes; therefore, it was concluded that LEQ students were disposed negatively towards the non-linear, unstructured method of computer-based instruction.

The third research question focused on LEQ students assigned to the LCBI method. The assumption was that these students would prefer this method because its structured nature eliminates the need to make decisions related to self-directed learning. The correlation was not significant; however, it was noteworthy that the correlation,  $r_s(14) = 0.3801$ ,  $p = 0.16$ , was the second strongest. The answer to the third research question was inconclusive.

The fourth research question examined the HEQ students assigned to the LCBI method. The assumption was that HEQ students, possessing higher levels of intrinsic abilities needed for success with e-learning, would not prefer this method because it did not permit them to determine the nature and makeup of their lessons. The correlation was not significant and suggested that HEQ students seemed to be equally accepting of either form of instruction.

There were two noteworthy findings. The first was the confirmation of the second research question that the attitudes toward non-linear, computer-based instruction for students identified as LEQ correlated negatively with their emotional-social intelligence scores. The second was that students, in general, indicated a preference towards the more interactive, non-linear, unstructured form of computer-based instruction (HCBI). Additionally, the results seemed to indicate that HEQ students were more consistently and favorably responsive to either form of computer-based instruction; LEQ students expressed more variation in attitudes toward computer-based instruction in general, and HCBI instruction in particular. Lastly, there were a number of significant, but disparate findings and associations, as well as suggestive indications that seemed to justify further research.

Several issues related to sample size, variance, cell frequencies, and outliers were noted. Additionally, there were challenges associated with the failure of the course management system. Because of these constraints, it cannot be said that these conclusions presented an accurate description of relationships that may have existed between emotional-social intelligence and attitudes toward computer-based instruction. These issues could have compromised the data and subsequent results.

The results of this study reported that Bar-on's ES-i:S and Keller's IMMS instruments seemed to work as designed and confirmed that there were some differences with respect to perceptions of computer-based instruction based upon emotional-social intelligence. Yet, the limited conclusions for three of the four research questions inhibit any generalizations that may be drawn. Several implications emerged from the findings.

The first salient finding was the strong negative correlation between emotional-social intelligence and attitudes, influenced in part by LEQ students' IMMS responses related to satisfaction with the instructional method. As emotional-social intelligence abilities increased,

students derived less satisfaction from the non-linear, unstructured form of computer-based instruction. Song and Keller (2001) noted that the appeal related to the novelty and variety associated with technology tended to disappear with familiarity. Concurrently, Bar-On (2006) noted that self-actualization required good problem solving skills and a strong sense of self-awareness. Therefore, it is possible that increasing levels of emotional-social intelligence could result in accelerated familiarity, and that as a person's abilities at self-awareness and problem-solving increase, their perception of the level of difficulty associated with the HCBI method could also increase. Both scenarios could theoretically foster the observed negative correlation with attitude towards non-linear, unstructured computer-based instruction. The implication is that students assessed in the low-average range of emotional-social intelligence may not thrive when exposed to unstructured forms of e-learning. Further research is warranted.

The second key finding was that students seemed to prefer the more interactive, non-linear, unstructured form of computer-based instruction (HCBI), and was supported by research that concludes "full-featured treatments were superior to minimalist treatments" (Keller & Suzuki, 2004, p. 235). This implies that instructors should avoid simply posting presentations on the Web and expecting students to learn. Interaction and stimulation, preferably adaptive in accordance with Keller and Suzuki's research (2004), is needed to prompt students' engagement with computer-based instructional materials. Qualitative feedback also suggested that the amount of content addressed by the lesson plan be organized into smaller components followed by reviews of key points. One student implied the audio slowed them down, because they had already read the material, while others implied that there were too many words on the pages and that they scrolled too fast on the videos. The implication is that students absorb written materials at different rates, and computer-based instruction needs to be designed with features that provide the learner control over the speed of presentation and ability to review content selectively.

Graphs suggested that students with average-high emotional-social intelligence (HEQ) seemed more positive and accepting of either computer-based form of instruction than students with low-average emotional-social intelligence (LEQ) but were unsubstantiated by the findings. Given the constraints, this conclusion needs further investigation. If established, the implication is that students could be assessed prior to instruction to determine their chances of success in a computer-based environment. This is a problematic implication for instructors. Requiring them to provide multiple forms of instruction to accommodate differing levels of emotional-social intelligence could be unrealistic. Doing so, however, would be in accordance with research that has indicated interpersonal learner support and learning styles must be integrated throughout course design (Gardner, 1999; Thorpe, 2002).

There were a number of limitations associated with this study. The first limitation related to the nature of descriptive studies, such as a correlational study. Correlational studies often attempt to "break down complex abilities and behavior patterns into simpler components (Gall, Gall, and Borg, 2003, p. 329). Simplifying complicated behaviors opens such research to the possibility of finding and misinterpreting significant associations (Best & Kahn, 2006). For this reason, conclusions must be considered with caution.

The second limitation was related to the sample and its unequal cell frequencies across most analyses. In order to achieve more reliable findings, it would be appropriate to limit the

subdivisions and expose students to one form of computer-based instruction, therefore, achieving a larger sample size. This is in accordance with Gall, et al., (2003), who noted that small sample size is often an issue in educational research, especially when subdividing the sample into groups, as was the case for this study. Their recommendation is to “consider comparing only the two most theoretically interesting or most promising treatments” (p. 388). Another limitation with the sample was the use of university students as the sample population. Students who attend college can be conceived as self-selected, in that they made a specific choice to accept the rigors associated with higher education. In this context, it is logical to assume that a student willing to make this choice is more likely to possess emotional-social intelligence in the average-high range, than a student who chooses not to apply or attend. Of course, this is a generalization; there can be many reasons why a student would choose not to attend college. However, self-selection could possibly explain why most of the ESI scores were in the average-high range.

The third limitation was related to the sample distribution of emotional-social intelligence (ESI) and the use of two categories (HEQ/LEQ) for analysis, which was quite limiting in terms of discrimination. Most of the students scored average-high ESI, driving the non-orthogonal nature of the data. When grouped using Bar-On’s categories, however, there were insufficient numbers of students identified as markedly low, very low, or low for meaningful analysis.

The fourth limitation was found in the online, course management access challenges experienced in the fall. Unfortunately, this is a reality of computer-based instruction. Technology can and does occasionally fail resulting in situations beyond the instructor’s control. Alternative scheduling and access plans need to be considered prior to implementation.

The fifth limitation pertained to the missing values and presence of outliers and leverage points. Often, this is unavoidable, especially in educational research, because of student issues such as absences, student choices (e.g., choosing not to provide gender or age data), or simply student carelessness and apathy toward the study. Unavoidable or not, incomplete, insincere, or missing measurements limit the validity of findings (Gall, et al., 2003).

The final limitations were found in the assessment instruments. The first relates to the self-report nature of both instruments, but especially the EQ-i:S. Self-reports are subject to potential biases due to a tendency by respondents to withhold embarrassing responses or to express socially acceptable responses, and the emotional involvement of the individual with his or her own problems are limitations of personality self-report measures (Best & Kahn, 2006). Secondly, emotional-social intelligence is a topic of significant debate with no clear consensus in the scientific community regarding the nature and extent of the concept.

The suggestion that students with average-high emotional-social intelligence (HEQ) seemed more positive and accepting of either computer-based form of instruction than students with low-average emotional-social intelligence (LEQ) was unsubstantiated by the findings. However, with respect to the limitations, further research should be conducted to determine, if indeed, such a conclusion is justified. In light of the limitations, conclusions, and implications of the study, the following recommendations are offered for future practice and research:

1. The finding that students seemed to prefer the more interactive, non-linear, and unstructured form of computer-based instruction (HCBI), and the preference for the use of audio and video, provides direction for educators contemplating computer-based methods. Lessons should be interactive and incorporate high quality audio and video, with content organized into shorter, more discrete units with frequent reviews of key points.
2. Although many of the findings were inconclusive, the evidence suggested a possible association between emotional-social intelligence and attitudes toward computer-based instruction. The finding that students seemed to prefer the HCBI method over LCBI indicated that HCBI is likely the most promising method. Future studies should be conducted using the HCBI instructional method in accordance with Gall et al. (2003) who recommended using only the most promising treatment to limit subdivision of the sample. Furthermore, a one group pretest-posttest design as described by Gall et al (2003) could be applied. While normally not recommended due to issues of internal validity, the use of estimated gains from prior data can be substituted for a control-comparison design. This is sometimes done in educational venues, where restrictions exist that do not permit introducing different students within one class to varying forms of instruction. (Gall, et al., 2003).
3. The issues related to sample distribution by emotional-social intelligence made it difficult to effectively analyze the data. Using two categories (HEQ/LEQ) did not provide sufficient discrimination; however, using Bar-On's seven categories subdivided the sample to such a degree that analytical procedures were ineffective. Since Bar-On (2002) noted that his groupings are not absolute rules, dividing ESI scores into four categories (low, low-average, average-high, high) might be more realistic and discriminating, and is recommended.
4. Using university students as a sample can be problematic in that a university's selection process could, in fact, exclude students of low-average emotional-social intelligence. Future research should include and examine other populations, perhaps at the secondary school level, where emotional-social intelligence is being cultivated. However, a different version of the EQ-i instrument would be required, since it is designed for adults (Bar-On, 2002).

Clearly, students are driven by intrinsic motivators, such as emotion, and extrinsic motivators, such as instructional design. Concurrently, computer-based technology and instruction have become integral parts of American society and education. Therefore, identifying and associating individual intrinsic motivators, such as emotional intelligence, with corresponding extrinsic motivators, such as appropriately designed computer-based instruction, would be a step forward in the process of engaging students with relevant educational content and preparing them for success. Future research studies that focus on identifying optimal methods for designing and delivering computer-based instruction are needed.

## REFERENCES

- Aragon, S. R., Johnson, S. D., & Shaik, N. (2002). The Influence of learning style preferences on student success in online versus face-to-face environments. *American Journal of Distance Education, 16*(4), 227.
- Bar-On, R. (2002). BarOn emotional quotient inventory: Short - technical manual. New York: Multi-Health Systems.
- Bar-On, R. R. (2006). The Bar-On model of emotional-social intelligence (ESI). *PSICOTHEMA REVISTA DE PSICOLOGIA, 18 Suppl*, 13-25.
- Behnke, C., & Ghiselli, R. (2004). A comparison of educational delivery techniques in a foodservice training environment. *Journal of Teaching in Travel and Tourism, 4*(1/2).
- Best, J., W., & Kahn, J., V (2006). *Research in education* (10 ed.). Boston: Pearson Education, Inc.
- Chen, C. (Ed.). (2002). *Robust regression and outlier detection with the ROBUSTREG procedure*. Cary, NC: SAS Institute Inc.
- Chen, C., & Jones, K. (2007). Blended learning vs. traditional classroom settings: Assessing effectiveness and student perceptions in an MBA accounting course. *The Journal of Educators Online, 4*(1).
- Cherniss, C. (2000). *Emotional intelligence: What it is and why it matters*. Paper presented at the Annual Meeting of the Society for Industrial and Organizational Psychology. Retrieved 11/2/07, from [http://www.wghill.com/assessments/what\\_is\\_emotional\\_intelligence.pdf](http://www.wghill.com/assessments/what_is_emotional_intelligence.pdf)
- Cherniss, C. (2004). Emotional intelligence. In C. D. Spielberger (Ed.), *Encyclopedia of applied psychology* (Vol. 3). Amsterdam: Elsevier Academic Press.
- Cody, R., P., & Smith, J., K (2006). *Applied statistics and the SAS programming language* (5 ed.). Upper Saddle River: Pearson.
- Costello, C., Gaddis, T., Tamplin, M., & Morris, W. (1997). Evaluating the effectiveness of two instructional techniques for teaching food safety principles to quick service employees. *Foodservice Research International, 10*(1), 41-50.
- Dawda, D., & Hart, S. D. (2000). Assessing emotional intelligence: reliability and validity of the Bar-On Emotional Quotient Inventory (EQ-i) in university students. *Personality and Individual Differences, 28*(4), 797-812.
- Day, J., Janus, A., & Davis, J. (2005). *Computer and internet use in the United States: 2003*. Retrieved 9/21/07. from <http://www.census.gov/prod/2005pubs/p23-208.pdf>.
- Diaz, D. P. (2002). Online drop rates revisited. *The Technology Source*. Retrieved from [http://technologysource.org/article/online\\_drop\\_rates\\_revisited/](http://technologysource.org/article/online_drop_rates_revisited/)

- Dulewicz, V., Higgs, M., & Slaski, M. (2003). Measuring emotional intelligence: Content, construct and criterion-related validity. *Journal of Managerial Psychology, 18*(5), 405.
- Faryadi, Q. (2007). Instructional design models: What a revolution! , 18. Retrieved from [http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content\\_storage\\_01/0000019b/80/28/03/f0.pdf](http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/28/03/f0.pdf)
- Feinstein, A., Raab, C., & Stefanelli, J. (2005). Educational technology research in the hospitality industry. *Journal of Hospitality & Tourism Education, 17*(4), 9-18.
- Gabrielle, D. (2003). *The effects of technology-mediated instructional strategies on motivation, performance, and self-directed learning*. Florida State University.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). Boston: Pearson Education.
- Gardner, H. (1999). *Intelligence reframed*. New York: Basic Books.
- Harris, K. J., & Bonn, M. A. (2000). Training techniques and tools: Evidence from the foodservice industry. *Journal of Hospitality and Tourism Research, 24*(3), 320-335.
- Haugen, S., LaBarre, J., & Melrose, J. (2001). Online course delivery: Issues and challenges. *Issues in Information Systems, 2006*(2),
- Huang, D. W., Diefes-Dux, H., Imbrie, P. K., Daku, B., & Kallimani, J. G. (2004). *Learning motivation evaluation for a computer-based instructional tutorial using ARCS model of motivational design*. Paper presented at the Frontiers in Education, 2004. FIE 2004. 34th Annual.
- Keller, J. M. (1983). *Development and use of the ARCS model of motivational design*.
- Keller, J. M. (1999). Using the ARCS motivational process in computer-based instruction and distance education. *New Directions for Teaching and Learning, 1999*(78), 37.
- Keller, J. M., & Suzuki, K. (2004). Learner motivation and e-learning design: A multinationally validated process. *Journal of Educational Media, 29*(3), 229-239.
- Keller, J. M. (2006). Development of two measures of learner motivation. Unpublished Manuscript in progress. Florida State University.
- Klein, H., J , Noe, R., A , & Wang, C. (2006). Motivation to learn and course outcomes: The impact of delivery mode, learning goal orientation, and perceived barriers and enablers. *Personnel Psychology, 59*, 665-702.
- Krentler, K. A., & Willis-Flurry, L. A. (2005). Does technology enhance actual student learning? The case of online discussion boards. *Journal of Education for Business, 80*(6), 316.

- Martinez, M. (2003). High attrition rates in e-learning: Challenges, predictors, and solutions. *The eLearning Developers' Journal*. Retrieved from [www.elearningguild.com/pdf/2/071403MGT-L.pdf](http://www.elearningguild.com/pdf/2/071403MGT-L.pdf)
- McEnrue, M. P., & Groves, K. (2006). Choosing among tests of emotional intelligence: What is the evidence? *Human Resource Development Quarterly*, 17(1), 9-42.
- McLellan, H. (1998). The internet as a virtual learning community. *Journal of Computing in Higher Education*, 9(2), 92-112.
- Newsome, S., Day, A. L., & Catano, V. M. (2000). Assessing the predictive validity of emotional intelligence. *Personality and Individual Differences*, 29(6), 1005.
- O'Connor, R. M., & Little, I. S. (2003). Revisiting the predictive validity of emotional intelligence: self-report versus ability-based measures. *Personality and Individual Differences*, 35(8), 1893-1902.
- Oblinger, D. G., Barone, C. A., & Hawkins, B. L. (2001). *Distributed education and its challenges: An overview* (Information Analyses): American Council on Education, Washington, DC. Center for Policy Analysis.; EDUCAUSE, Washington, DC.
- Palladino, J. J., & Bloom, C. M. (2008). Motivation and emotion. In S. F. Davis & W. Buskist (Eds.), *21st Century PSYCHOLOGY: A Reference Handbook* (pp. 422-429). Los Angeles: Sage Publications.
- Parker, J. D. A., Creque, R. E., Barnhart, D. L., Harris, J. I., Mejeski, S. A., Wood, L. M., et al. (2004). Academic achievement in high school: does emotional intelligence matter? *Personality and Individual Differences*, 37(7), 1321.
- Parker, J. D. A., Summerfeldt, L., Hogan, M. J., & Majeski, S. A. (2004). Emotional intelligence and academic success: examining the transition from high school to university. *Personality and Individual Differences*, 36(1), 163.
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667-686.
- Pintrich, P.R., DeGroot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Powell, R., Conway, C., & Ross, L. (2007). Effects of student predisposing characteristics on student success. *Journal of Distance Education*, 5(1), 20. Retrieved from <http://sfx6.exlibrisgroup.com/purdue?sid=google;auinit=R;aualast=Powell;atitle=Effects%20of%20student%20predisposing%20characteristics%20on%20student%20success;title=Journal%20of%20distance%20education;volume=5;issue=1;date=1990;spage=20;issn=0830-0445>

- Schacter, J. (1999). *The impact of education technology on student achievement: What the most current research has to say*. Santa Monica: Milken Exchange on Education Technology.
- Sivin-Kachala, J., & Bialo, E. R. (1994). *Report on the effectiveness of technology in schools, 1990-1994* (Information Analyses Reports - Research): Interactive Educational Systems Design, Inc., New York, NY.
- Song, S. H., & Keller, J. M. (2001). Effectiveness of motivationally adaptive computer-assisted instruction on the dynamic aspects of motivation. *Educational Technology Research and Development, 49*(2), 5-22.
- Summers, J., Waigandt, A., & Whittaker, T. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education, 29*(3), 233.
- Suzuki, K., & Keller, J. M. (1996). *Creation and cross cultural validation of an ARCS motivational design matrix*. Paper presented at the Annual Meeting of the Japanese Association for Educational Technology. Retrieved 8/25/08, from <http://mailer.fsu.edu/~jkeller/Articles/Suzuki%20Keller%201996%20Validation%20of%20Matrix.pdf>
- Thompson, L. F., & Lynch, B. J. (2003). Web-based instruction: Who is inclined to resist it and why? *Journal of Educational Computing Research, 29*(3), 375.
- Thorpe, M. (2002). Rethinking learner support: the challenge of collaborative online learning. *Open Learning, 17*(2), 105-119.
- Tjaden, B. J., & Martin, C. D. (1995). Learning effects of CAI on college students. *Computers and Education, 24*(4), 271-277.
- Van Rooy, D. L., & Viswesvaran, C. (2004). Emotional intelligence: A meta-analytic investigation of predictive validity and nomological net. *Journal of Vocational Behavior, 65*(1), 71-95.
- Vroom, V. H. (2005). On the origins of expectancy theory. In K. G. Smith & M. A. Hitt (Eds.), *Great Minds in Management*. Oxford: Oxford University Press.
- Warren, L. L., & Holloman, H. L. (2005). On-line instruction: Are the outcomes the same? *Journal of Instructional Psychology, 32*(2), 148.
- Zhang, D., Zhao, J. L., Zhou, L., & Nunamaker, J. F. (2004). Can e-learning replace classroom learning? *Communications of the ACM, 47*(5), 75-79.