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Beyond the Classroom Walls:

Teachers' and Students' Perspectives on How Online Learning Can Meet the Needs of Gifted Students

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Online learning programs have exploded on the educational scene, with more than one million K–12 students enrolled in some form of online learning last year (Picciano & Seaman, 2009) and enrollments reported to be growing at a rate of approximately 30% annually (International Association for K–12 Online Learning, 2008). Online programs—with their capacity to provide expanded access to advanced courses, as well as a more flexible, more individualized, and more student-centered approach to learning—have the potential to be a particularly good option for serving gifted students. However, there is little empirical research that examines whether and how online environments might provide a good match for the needs of many gifted learners.

Learning Styles and Personality Characteristics of Gifted Students

Although gifted students tend to be similar insofar as they have demonstrated outstanding performance or potential in at

Online learning programs have the potential to provide gifted students expanded access to advanced courses, but little research has been conducted on how well or in what ways the online environment is a good match for gifted students. The study presented here is an in-depth qualitative and quantitative investigation of the perceptions and experiences of academically talented students and their teachers about courses offered through an online program designed specifically for gifted students. Participants in this study included 28 instructors currently teaching at least one online course and 65 students in grades 3–12 currently enrolled in at least one online course offered by a supplemental school offering both online and face-to-face programming for gifted students. According to the gifted students and teachers interviewed and surveyed in this study, the online format is conducive to a more individualized and differentiated learning experience than is often possible in a regular classroom. Students are able to work at a pace consistent with their rate of learning, have more time to reflect, to feel more in control of the learning process, and to engage in more self-directed and independent learning. These benefits and others indicate the online programming can be an effective means of meeting the needs of many gifted students.

summary

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least one domain of study, it is important to note that they are at least as heterogeneous as nongifted students in their interests, learning style preferences, and personality characteristics. Nonetheless, research has found that gifted students' learning styles and personality characteristics, as a whole, do tend to cluster around certain group traits.

Within the past 10 years, two large-scale studies (Mills, 2003; Oakland, Joyce, Horton, & Glutting, 2000), each involving more than 1,200 students ranging in age from 8–17, examined the personality-based learning styles of gifted versus nongifted students. In Mills' (2003) study, 1,247 highly able students in grades 7–10 were administered the Myers Briggs Type Inventory (MBTI), while the Student Styles Questionnaire was used in Oakland et al.'s (2000) study of 1,554 gifted and nongifted students ages 8–17. Both Mills (2003) and Oakland et al. (2000) came to similar conclusions about the personality-based learning styles of gifted students. Oakland et al. (2000) concluded that gifted children have a greater proclivity to understand complex interconnections of ideas, enjoy theory, and learn by insight. Likewise, Mills (2003) inferred from her results that gifted students tend to prefer abstract themes and concepts, and tend to be open and flexible. She also concluded that gifted students tend to value logical analysis and objectivity.

Other studies have looked at the learning style preferences of gifted students compared to that of nongifted students, as measured by Dunn, Dunn, and Price's Learning Style Inventory (LSI; 1989). The LSI consists of 22 components within the following five categories of learning preferences: (a) physical environment (e.g., sound, temperature, light, and seating); (b) emotionality (e.g., motivation, persistence, responsibility, and structure); (c) social preferences (e.g., learning alone, learning with peers, learning with adults present, learning in varied ways); (d) physiological inclination (e.g., perceptual preferences, intake, energy highs and lows, and mobility); and (e) psychological preferences (e.g., global vs. analytic). Dunn et al. (1989) found that academically gifted adolescents had unique preferences and tendencies. Specifically, gifted students perceived themselves to be highly responsible

for and committed to their learning; preferred to learn through their tactile and kinesthetic senses (i.e., by actively perceiving and manipulating their physical environment), preferred learning alone, did not need structure (e.g., organization or guidance), and indicated less preference for using the auditory sense for learning (perhaps, say the authors, because they are more likely to want to concentrate on ideas and extrapolate rather than merely listen). Another study, conducted by Ricca (1984), and similar in scope, with approximately 200 students in each comparison group, found gifted students to be more highly motivated, persistent, and responsible, as well as highly adult and teacher motivated. The gifted students also had a stronger preference for learning alone and tactile learning. In comparison to the nongifted students, gifted students furthermore exhibited less of a need for structure, peer-oriented learning, auditory learning, visual learning, mobility, and learning with authority figures present. Taken together, these findings suggest that regular classroom instruction, which often emphasizes high-auditory memory skills, structure, fact learning, and peer collaboration, may not be ideal for some gifted learners who are highly tactual, conceptual, open/flexible, and independent learners.

Best Practices in Gifted Education

The unique learning style preferences of gifted students, combined with their academic competence and rapid rate of cognitive development, provide a strong rationale for curricular and instructional adjustments (Archambault et al., 1993). Rogers' (2007) very thorough synthesis of the research on instructional and curricular practices in the field of gifted education during the past 150 years highlighted the practices that are most strongly supported by the empirical research. VanTassel-Baska and Brown (2007) examined the existing research on 11 curriculum models that have been used to shape high-level learning experiences for gifted students, with an eye to their effectiveness.

Both reviews of the literature stressed the need for gifted students to have exposure to advanced content beyond their grade level. In particular, various forms of subject- or grade-based acceleration, based on an individual student's demonstrated skill level and content mastery, have been shown to be effective (Rogers, 2007; VanTassel-Baska & Brown, 2007). Curriculum compacting—in which students are given "credit" for material already mastered and allowed to replace it with differentiated, accelerated, and more complex activities—has also proven to be successful in meeting many gifted students' academic as well as social and emotional needs (Rogers, 2007; VanTassel-Baska & Brown, 2007). The use of flexibly organized instructional grouping of gifted students by subject area based on a student's documented level of learning was another practice with strong support in the research (Feldhusen, 1981; Rogers, 2007; VanTassel-Baska & Brown, 2007).

In addition to providing exposure to advanced content, Feldhusen (1981), Rogers (2007), and VanTassel-Baska and Brown (2007) recommended allowing gifted students to progress more rapidly through material, at a pace appropriate to their individual learning rate. Research supported the theory that if bright children are to retain what they have learned (especially in math, science, and languages), it must be presented at their actual learning rate, not considerably slower than that rate (Rogers, 2007).

The use of inquiry- and problem-based learning in particular and student-centered learning in general were also shown to have positive effects on motivation to learn, engagement, and academic performance (Rogers, 2007; VanTassel-Baska & Brown, 2007). Further, VanTassel-Baska and Brown (2007; Hargrove, 2005; Hughson, 1964; Sternberg & Grigorenko, 2003) argued that gifted students need opportunities to develop their critical thinking skills (i.e., to analyze, reason from evidence, examine quality, compare and contrast, critique, evaluate, and make improvements to their knowledge) and to develop their creative thinking skills (i.e., to imagine, create, discover, and predict with their knowledge). And research has shown that providing regular opportunities for gifted students to work independently in their areas of

passion and talent is also a key component in meeting the needs of gifted students and has a positive effect on motivation to learn (Rogers, 2007; VanTassel-Baska & Brown, 2007).

Rogers (2007) and VanTassel-Baska and Brown (2007) both urged that gifted students have opportunities to relate intellectually, artistically, and affectively with other gifted, creative, and talented students (see also Feldhusen, 1981). According to VanTassel-Baska and Brown, establishing strong teacher-learner connections, paying attention to affect in teaching, creating an environment in which students feel comfortable expressing themselves and taking risks, and modeling flexibility/openness were also shown to translate into gains in motivation and engagement (see also Hargrove, 2005; Hughson, 1964; Sternberg & Grigorenko, 2003).

Benefits of Online Learning

The potential advantages of taking online courses are numerous. Among the benefits most often and most consistently reported in the literature is expanded access: namely, access to broader educational opportunities for students who are unable to attend traditional schools, access to advanced courses and/or courses not typically offered in students' local schools, and access to resources and instructors not locally available (Cavanaugh, Clark, & Barbour, 2008; Li & Beverly, 2008; Ravaglia, Suppes, Stillinger, & Alper, 1995; Wallace, 2005). The access to advanced courses, to highly qualified instructors, and to high-quality resources can be particularly beneficial for gifted students. Online programs can make it possible for qualified students to take advanced courses commensurate with their ability level years before they would normally be able to do so, match them with instructors and/or mentors whose expertise and interests match their own, and provide them with resources that allow them to take their interest and learning in a subject area far beyond that to which they would otherwise be exposed (Ravaglia et al., 1995; Wallace, 2005).

Another oft-reported benefit of the online learning environment is the flexibility it affords students, who often have access to course material and assignments 24 hours a day, 7 days a week (Cavanaugh et al., 2008; Li & Beverly, 2008; Ravaglia et al., 1995; Wallace, 2005). For gifted students, this means that they are able to take additional and/or advanced courses without it being necessary for them to change their normal school situation, as their work on these courses can be scheduled around other classes and extracurricular activities (Li & Beverly, 2008; Ravaglia et al., 1995; Wallace, 2005).

The online learning format also allows for the use of a wide range of varied multimedia tools to present the course material (Cavanaugh, 2007; Dykman & Davis, 2008; Li & Beverly, 2008; Moore, 2007; Ravaglia et al., 1995), which may allow students more opportunities to choose the strategies that best suit their particular learning styles (Moore, 2007), can provide students more control and direction over their own learning (Cavanaugh, 2007), can encourage independent learning and build students' sense of accountability for their own learning (Li & Beverly, 2008), and often allows students the opportunity to review certain units multiple times or work through the material at a faster pace, according to their individual learning rate (Ravaglia et al., 1995).

The research on online learning has also found that the online learning environment opens up doors to a more informal type of communication (Cavanaugh et al., 2008; Dykman & Davis, 2008; Li & Beverly, 2008; Wallace, 2005). Because of the nature of the online format, with its emphasis on "anytime, anyplace" asynchronous learning, most of the communications between instructors and learners are one-on-one, which opens up the door to the development of a teacher-learner relationship that is more along the lines of a mentor-mentee relationship (Cavanaugh et al., 2008; Dykman & Davis, 2008; Li & Beverly, 2008).

Finally, although the results from attempts to quantitatively compare the effectiveness of online education and classroom instruction have, on the whole, been inconclusive and fraught with methodological concerns (Zhao, Lei, Yan, Lai, & Tan, 2005), a recent meta-analysis conducted by the U.S. Department

of Education (2009) found that, on average, students in online or blended courses performed better on standardized tests, researcher-created assessments, teacher-created assessments (e.g., midterm/final exams), or grades/grade point averages than those taking the same course through traditional face-to-face instruction (average effect size was .24). Several other meta-analyses (Cavanaugh et al., 2008; Li & Beverly, 2008; Shachar & Neumann, 2003; Sitzmann, Kariger, Stewart, & Wisher, 2006) also found that students in online courses performed at least as well or better than students in face-to-face classrooms. Cavanaugh et al.'s (2008) review of the literature additionally pointed to greater improvement in critical thinking, researching, using computers, learning independently, problem solving, creative thinking, decision-making, and time management skills of online students compared to their counterparts in traditional classroom settings. Allen, Bourhis, Burrell, and Mabry's (2002) meta-analysis of the research on student satisfaction, however, found slightly higher levels of student satisfaction with conventional classroom teaching/learning. Bernard et al.'s (2004) larger scale meta-analysis of the research found essentially no differences in student achievement or student satisfaction, but reported a very high degree of variability in achievement and student satisfaction across online/distance education programs, indicating that some online/distance education programs far outperform conventional face-to-face classrooms, but others perform far worse.

Challenges of Online Learning

Unsurprisingly, the online learning environment poses some challenges to student learning as well as numerous benefits. The challenges most often reported in the research literature generally fall into two broad categories: challenges due to a mismatch between students' specific learning style preferences and the online learning environment, and challenges in communication.

With respect to challenges due to a mismatch between students' specific learning style preferences and the online learning

environment, Cavanaugh et al.'s (2008) review of the research suggested that in an online environment, extroverted students may miss the face-to-face interaction with peers, and students who do not have strong verbal/reading skills may experience a disadvantage in a text-heavy online environment. Li and Beverly's (2008) review of the research added that the online learning environment may not be ideal for students who have trouble staying motivated or lack self-discipline, students who are less independent or do not enjoy working independently, students who require more hands-on assistance, students who do not have basic computer skills or are not comfortable with technology, and students who do not have advanced communication, time management, and organization skills.

With respect to challenges in communication, Li and Beverly (2008) noted that in the online environment there is a much greater potential for misunderstanding, especially in the affect of e-mail correspondence (e.g., students can sometimes come across as too informal and even rude, and instructors can sometimes come across as overly harsh or critical). Dykman and Davis (2008) also noted that in an online classroom there tend to be fewer opportunities for the sort of informal interactions between students and between teacher and student that serve to reinforce expectations and clarify misunderstandings. Furthermore, when there is a breakdown in communication in the online learning environment, the situation can sometimes deteriorate without either party realizing that there is a problem until it is too late (Dykman & Davis, 2008).

Best Practices in Online Learning

In recent years, a number of studies have attempted to synthesize the research on effective online instructional strategies and develop a set of guidelines for best practices in online teaching. These recommendations can be organized to loosely correspond to the two broad categories of challenge faced by online learners noted above.

The first broad category of recommendations for online teachers includes strategies that focus on structuring the online course environment in such a way as to help students direct and regulate their own learning and to stimulate and maintain motivation, interest, and engagement in the class. A number of studies (Artino, 2008; Cavanaugh, 2007; DiPietro, Ferdig, Black, & Preston, 2008; Dykman & Davis, 2008; National Education Association, 2006) stressed the importance of clarity of format, expectations, and instructions to help students self-direct their own learning appropriately and assist them in acquiring the skills of autonomous learning. Similarly, a clear course timeline that balances flexibility and self-pacing with clear deadlines and expectations for group participation was recommended for helping students stay on track to complete the course in the time period allotted (Artino, 2008; Cavanaugh, 2007; DiPietro et al., 2008; Dykman & Davis, 2008; National Education Association, 2006). Many of these studies also reported that online courses that included activities and assignments that were varied, student-centered, designed around authentic problems, and/or triggered learner reflection and self-monitoring of understanding enhanced students' self-efficacy, motivation, and/or overall learning (Artino, 2008; Cavanaugh, 2007; Cavanaugh et al., 2008; DiPietro et al., 2008; National Education Association, 2006; Sitzmann et al., 2006).

The second broad category of recommendations for online teachers includes strategies that focus on good communication and developing a strong bond between teacher and learner, and also between students and their peers. All of the reviews of the literature cited here (Artino, 2008; Cavanaugh, 2007; Cavanaugh et al., 2008; DiPietro et al., 2008; Dykman & Davis, 2008; National Education Association, 2006; Sitzmann et al., 2006) emphasized the positive effect of frequent, timely, individualized, and detailed feedback from instructors on students' self-efficacy, motivation, and/or engagement in the course. Most of these studies also indicated that when students feel a "connection" with their instructor and feel that their instructor is committed to their success, there is a an increase in students' confidence and moti-

vation (Artino, 2008; Cavanaugh, 2007; DiPietro et al., 2008; National Education Association, 2006). Finally, the research literature indicated that students who are provided opportunities and encouraged to collaborate and seek help from their peers tend to experience greater success; moreover, the research has shown that instructors can play a key role in developing a strong sense of community by modeling appropriate online communication by participating in and guiding discussion, paying attention to affect in communication, and improving the quality of discussion through critical evaluation and encouragement to take their thinking to the next level (Artino, 2008; Cavanaugh, 2007; DiPietro et al., 2008; National Education Association, 2006; see also numerous studies related to Garrison, Anderson, & Archer's [2000] "community of inquiry" framework).

Summary

The literature on the benefits and challenges of, and best practices in, online learning highlight the intriguing potential of the online environment to provide a good match for the learning style preferences of many gifted students and to be conducive to many recommended "best" practices in gifted education. However, there is currently very little empirical research on the benefits and challenges of online learning specifically for gifted students. Similarly, there is little to no research on specific online instructional strategies and/or characteristics of the online environment that help to create a successful online learning for gifted students. Research on gifted students and their perceptions and experiences with online learning warrants further investigation.

The Purpose of This Study

Understanding the benefits, challenges, and key characteristics of online environments that facilitate a successful learning experience from the perspectives of multiple parties, including

online teachers and their gifted students, can help online educators and program administrators meet the needs of advanced students more effectively. This study is an in-depth qualitative and quantitative investigation of the perceptions and experiences of academically talented students and their teachers about courses offered through an online program designed specifically for gifted students. By means of interviews with and surveys of current students enrolled in the online program and their teachers, this study seeks to provide a better understanding of how online learning might provide a good match for gifted students. Specifically, the following questions were addressed: According to teachers who have taught in both online and face-to-face classrooms and are experienced in working specifically with gifted learners, what are the benefits and challenges of the online learning environment for this population of students? What are the benefits and challenges of the online learning environment from the perspective of gifted students? What do gifted students and their teachers perceive to be some of the key instructional strategies and/or characteristics of the online environment that facilitate a successful online learning experience? How do teachers' perceptions of the key characteristics of an effective online learning environment for their students match up with students' perceptions? How do teachers' and students' perceptions of what makes a successful online learning environment match up with the literature on best practices in gifted education?

Method

Participants

Participants in this study included 28 instructors teaching at least one online course through an accredited learning center and research facility at a large Midwestern university, which offers both online and face-to-face programming for gifted students, and 65 students enrolled in at least one online course during the 2008–2009 academic year through the center's online program.

Table 1

Program Characteristics

	Enrichment	Honors/AP®
Grade Level	Grades 3–8	Grades 6–12
Eligibility	95th percentile or above on a nationally normed, standardized achievement test or admission portfolio	Above-grade-level test scores or admission portfolio; scores requirements vary by course
Course Type	Session-based (courses begin and end on set date)	Individually paced (courses can begin on the 15th of any month and students work through the material at their own pace)
Duration	14 weeks (9 weeks during Summer session)	Up to 9 months from the start date
Course Model	Flexible Cohort: Students have substantial opportunities to interact with classmates and instructors through online discussions, collaborative projects and/or real-time class sessions	Facilitated Independent Study: Students work through coursework at their own pace, guided by a teacher who provides personal and individualized feedback; there are opportunities to interact with peers, mainly through asynchronous means

The center's online program is designed to provide academically talented students in grades 3–12 the opportunity to take online enrichment, high school honors, and AP courses across a wide variety of subject areas (see Table 1).

Teachers. The program's instructors are responsible for both designing and teaching their online courses. Instructors are hired based on their subject matter mastery, teaching experience, enthusiasm, ability to differentiate instruction, approachable teaching styles, and skill at providing engaging, thought-provoking, and varied learning experiences. Ninety-eight percent of instructors are certified teachers with expertise and experience in gifted education; some instructors (8%) are college professors. The majority of instructors (75%) teach for the center's online program in addition to teaching in a face-to-face classroom in their local communities; others (15%) have retired or taken some time off

from classroom teaching but did not want to give up teaching altogether and like the flexibility that the online environment offers. Still others (10%) teach a number of courses for the center as well as for other online programs and have made a career out of teaching solely online.

Extreme case sampling was used in the selection of teachers to be interviewed. Because several of the questions addressed by this study pertain to perceived key characteristics of an effective online learning environment, teachers were selected to be interviewed who were judged to be highly effective in the online classroom on the basis of end-of-course evaluations by students. Interview subjects were also selected so as to represent a variety of subjects and grade levels. Out of 10 teachers e-mailed, 9 consented and were interviewed. Four of the instructors interviewed taught enrichment courses for students in grades 3–5, 3 taught enrichment courses for students in grades 6–8, 3 taught honors-level courses for students in grades 6–12, and 3 taught AP-level courses for students in grades 6–12. Some of the instructors taught courses at multiple levels. The subject areas represented by the instructors selected to be interviewed were English and writing (3), science (3), humanities and social sciences (2), math (2), and technology (1). Seven of the interview subjects were female; 2 were male.

All 44 instructors who taught at least one course through the center's online program were sent an e-mail invitation inviting them to participate in a survey about perceptions and experiences of online teaching and learning; 28 instructors completed the survey. The number of years of online teaching experience of the teacher survey respondents ranged from 1 to 14, with 6.5 being the average number of years participants had been teaching in an online setting. The number of years of traditional face-to-face classroom teaching experience ranged from 4 to 45, with an average of 21.8 years. A majority of the 28 respondents taught multiple grade ranges: 7 (26%) of the respondents taught enrichment courses for students in grades 3–5, 13 (48%) taught enrichment courses for students in grades 6–8, and 22 (82%) taught honors- or AP-level courses for students in grades 6-12. Nine (32%) of the respondents taught English and writing courses, 8 (29%) taught

science courses, 8 (29%) taught humanities and social sciences courses, 6 (21%) taught mathematics courses, 3 (11%) taught technology courses, and 1 (4%) taught world language courses.

Students. Students are eligible to take a course through the center's online program if they meet minimum percentile ranks or scores on a nationally normed, standardized achievement test in the area that matches the class for which the student is applying (e.g., math for math or science classes, language or reading for humanities classes). Score requirements vary by course (see Table 1). If students are not able to provide qualifying test scores, they must submit additional documentation of their above-grade academic ability and achievement such as grade reports, portfolios, or additional teacher recommendations.

During the 2008–2009 academic year, 44% of program participants were female and 56% were male. More than a third of the students (37%) were in their middle school years (grades 6–8), 30% were in their high school years (grades 9–12), and 26% were in their elementary school years (grades 3–5).

Previous program evaluation research (Sanderson, 2009) showed that students choose to take an online course through the center for a myriad of reasons, including that they were seeking a more challenging curriculum (64.4%), they wanted to learn more about the subject (57.6%), they wanted an engaging and enriching learning experience (55.9%), their local school offerings were limited (42.4%), they wanted a more flexible learning environment (35.6%), they were unable to take similar offerings at their local school due to scheduling conflicts (15.3%), they took the course as part of their homeschool curriculum (13.6%), and/or their school offered this course as enrichment to their regular curriculum (5.1%).

Purposeful sampling was also used in the selection of students to be interviewed. Because it was expected that students who had completed more than one online course would have greater familiarity with a broader range of instructional styles and practices, and thus potentially be in a better position to discuss the pros/cons of certain practices vis-à-vis others, students were

selected to be interviewed who had taken more than one course through the center's program. Again, in the selection of interview subjects, care was taken to ensure that a variety of subjects and grade levels were represented. Out of 10 students e-mailed, 6 consented and were interviewed. Three of the students interviewed were currently enrolled in enrichment (2 in grades 3–5, 1 in grades 6–8), and 3 were currently enrolled in honors- and/or AP-level courses for students in grades 6–12 (2 in Honors, 1 in AP). The students were currently taking courses in the following subject areas: English and writing (3), science (3), math (3), and humanities and social sciences (2). Some of the students were currently taking multiple courses. Four of the interview subjects were male; 2 were female.

Approximately 900 students taking at least one course through the center's online program were sent an e-mail invitation inviting them to participate in a survey about perceptions and experiences of online teaching and learning; 65 students completed the survey. The average number of online courses taken by student survey respondents was 3.2, with some respondents having taken only one online course and others having taken as many as 20 (median = 2). A greater percentage of honors and AP students (75%) were represented in this study than were represented in the program as a whole. Reasons given by student participants for choosing to take a course online were similar to that of the program as a whole.

Data Collection and Analyses

An exploratory mixed methods research design (Creswell, 2008) was employed in this study. The results of initial, exploratory interviews with teachers and students were used to identify emerging themes that served as the basis for creating two survey instruments, one for teachers and one for students. By means of the resulting surveys, both qualitative and quantitative data were collected in order to identify the key instructional practices that create a successful online learning experience from the perspective of gifted students and their teachers.

Interviews. Two open-ended interview protocols, one for teachers and one for students, were developed (see Appendix A), and an e-mail (with consent form attached) was sent to selected students and teachers explaining the purpose of the study. Participants were given the option of being interviewed by phone or via e-mail. One teacher preferred to be interviewed by phone; the other teachers and all of the students preferred to receive the interview questions by e-mail and to type out their responses in a "reply" e-mail. Because the interviews were intended to be exploratory, the teachers and students were told (or informed via e-mail) that they did not have to answer all of the questions posed, but could select the ones that interested them most and/or elaborate as needed; or, if they preferred, they could simply ignore the interview prompts entirely and discuss their experiences with online teaching in a more free-form fashion.

The text of the e-mail interviews and detailed notes from the phone interview were analyzed in January 2009, using a six-step coding procedure in which (a) the original responses from each participant were scrutinized in their entirety, (b) text segments were identified, (c) the segments were labeled with codes, (d) the codes themselves were analyzed with an eye to reducing redundancy and overlap, (e) the data were reviewed for appropriateness of coding scheme, and (f) codes were collapsed into themes (Creswell, 2008). See Table 2 for the major themes that emerged from the interview data.

Surveys. Based on the themes that emerged in the teacher and student interviews, two separate online surveys, one for teachers and one for students, were created in order to gather both qualitative and quantitative data to further examine, with a larger sample, how the online environment might provide a good match for the needs of gifted students. The teacher survey consisted of 19 questions, 11 of which were open-ended. The student survey consisted of 12 questions total, 7 of which were open-ended.

In June 2009, an e-mail invitation (with consent form attached) asking for participation in this study was sent to 44 instructors and approximately 900 students who had enrolled

Table 2

Themes That Emerged in the Interview Data

	Teachers	Students
Teacher-Student Interaction		
Frequent/timely communication	X	X
Individualized feedback	X	X
Teacher presence, community building	X	X
Establishing a "personal connection"	X	X
Potential for misunderstanding	X	
Student-Content Interaction		
Development/organization of course	X	
Differentiation	X	X
Pacing/flexibility	X	X
Self-directed/student-centered learning	X	X
Varied resources	X	
More laser-focus on learning/time on task	X	X
Self-motivation	X	X
Access to knowledgeable instructor		X
Lack of face-to-face observation/modeling	X	X
Student-Student Interaction		
Scheduling	X	X
Enhancement of Learning	X	X
Fun		X
Safe environment	X	

in the center's online program during the 2008–2009 academic school year. Upon consent (or parental consent, in the case of the students), students were allowed to respond to the survey. A total of 28 teachers and 65 students responded to the survey from June to July 2009. Despite a low response rate of 7.2% for students, no follow-up e-mail was sent due to time constraints on the part of the researcher.

Qualitative data collected through the surveys were analyzed through the coding method described above. Quantitative data collected through the surveys were analyzed using Predictive

Analytics SoftWare (PAWS) Statistics, Version 18.0. Descriptive statistics were computed for each question. Comparisons of teachers' ratings of the importance of various practices for a successful online experience for gifted students by years of online teaching experience, years of face-to-face teaching experience, course type taught (enrichment vs. honors/AP), and subject area taught were conducted using independent-samples *t* tests. Comparisons of students' ratings of the importance of various practices for a successful online experience for gifted students by number of online courses taken and course type (enrichment vs. honors/AP) were conducted using independent-samples *t* tests. Comparisons of students' and teachers' ratings of the importance of various practices for a successful online experience were also conducted using independent-samples *t* tests.

Qualitative Results

Teachers' Perceptions

In the interviews and their open-ended survey responses, three overall categories emerged, within which the teachers' discussions of the benefits, challenges, and key characteristics of the online environment they have found to be most effective in their courses could be grouped. The first category was comprised of teachers' perceptions of teacher-student interaction in the online setting, the second of teachers' perceptions of student-content interaction in this setting, and the third of teachers' perceptions of student-student interaction. Within each of these broad categories, more specific themes emerged.

Teacher–Student Interaction. One of the themes that emerged most frequently in the teacher interviews and surveys was the importance of good communication between teacher and student for a successful online learning experience. In particular, the teachers stressed the value of frequent praise, encouragement, and feedback on assignments by means of individual e-mails. According

to these online teachers, one of the benefits of the online learning environment was that "the nature of the system is more geared to individuals" (personal interview, November 16, 2008). In contrast with a physical classroom, in which "a teacher must work with everyone simultaneously" (personal interview, November 16, 2008), one teacher noted that in an online classroom, "I can spend as much time with a student as I need, and praise and encourage them without other students thinking I'm paying more attention to a particular student" (personal interview, October 29, 2008). Another instructor, who described his courses as "extended individual e-mail conversations between me and each student," noted that these conversations were "more complex and interesting" than he expected, that "students are impressively honest" in these exchanges, that "there is more give and take," and that these conversations made online learning "more vital and real" than he had assumed it would be (open-ended survey response, June 23, 2009).

Many teachers also felt it was important to supplement individual e-mails with whole-class e-mails, which one instructor characterized as "the online version of eye contact" because these sorts of unprompted e-mails were useful for the purpose of teachers' establishing more of a "presence" (personal interview, November 4, 2008). These instructors used whole-class e-mails to make announcements (e.g., regarding their office hours or schedule for the week), send reminders about upcoming due dates or real-time class sessions, and let students know when a new assignment or resource had been posted. Many of them also used whole-class e-mails to share student successes, something that had happened in another class (including similar face-to-face classes they taught at their local school), or a relevant article/link they had just come across. These teachers believed regular group e-mails helped students stay motivated and on task.

Another theme that emerged frequently in the teachers' interviews and survey response was the value of building relationships, establishing a connection with each of their students, and creating a "rapport of trust" (personal interview, November 6, 2008) and "an atmosphere of openness and empowerment" (open-ended survey response, July 18, 2009). One of the most common ways

that teachers felt they were able to personalize the online learning experience was by conveying their own enthusiasm for the subject matter and commitment to the student's success. One teacher explained,

> I try to write each response with a sense of fun, and in a way that communicates my trust of the student and my enthusiasm for his or her participation in the class. This affective dimension is even more important when the assignment falls short of the mark. That's what I am most proud of, and I think that is why many students sign up for the second or even third levels of my class. The parents comment on the nature of the replies their students receive, the encouragement. You want the students to be able to sense that you like them, that you get a kick out of them, even though you have never actually met them. (personal interview, October 30, 2008)

Another common way that teachers personalized the experience was to ask students to "share interests, hobbies, goals, and other bits of information" and then to "link course material to their lives and get them to develop questions outside the context of the course curriculum" (open-ended survey response, June 24, 2009). One teacher noted that encouraging the students to talk about their interests had the added benefit of enabling students to "drift into" tangential discussions, which were often very rewarding (open-ended survey response, June 24, 2009).

The most common challenge noted by teachers with respect to teacher-student communication included the potential for misunderstandings in e-mail communications, both with respect to course content/course expectations, and with respect to affect/tone. One teacher explained: "I can't tell sometimes if something is wrong. In the regular classroom, I can FACE READ, and go get those students who look distressed. The online course is blind that way" (open-ended survey response, June 21, 2009). Another teacher wrote,

> I do a lot of things to help students connect to me and to each other, but it's tough. Tone doesn't always come through on e-mail, relationships take time and space and making that space for an online class can be difficult when you're not rubbing elbows every day. (open-ended survey response, June 27, 2009)

Student-Content Interaction. Many of the participating teachers indicated that there was little, if any, difference between their online and equivalent face-to-face courses with respect to the development of the course syllabi and goals or with respect to the rigor of the course: "They [the students in my online course and the students in my face-to-face course] cover most of the same material, except sometimes in my regular classroom we may end up skipping something because of time constraints. Online, the assignments are the assignments" (open-ended survey response, July 16, 2009). However, the teachers did note several major differences in how they facilitated the students' interaction with the course content.

One of these major differences, noted by an overwhelming majority of respondents, had to do with the set up of the course prior to student enrollment: specifically, developing and maintaining a well-organized course site that clearly and concisely specifies the instructor's expectations of students and instructions for completing assignments. The vast majority of teachers emphasized that in the online setting, "very specific directions are required for every task" (open-ended survey response, June 29, 2009). One teacher explained,

> In the traditional setting, materials created can be distributed and explained with the knowledge of what your particular students require in that moment. Students can ask questions at the same time, and they hear the instructor's responses to their peers' questions. In an online course, all of this has to be anticipated in advance. It requires me as a teacher to think carefully about what I want to accomplish and how those ends can be achieved. This

> also requires a bit of monitoring to see how the goals that have been established are being met or not being met by students as the course progresses. (open-ended survey response, July 1, 2009)

Several teachers noted that clear expectations and detailed instructions were especially important in the online environment, in which learning tends to be more self-directed, so that students have a concrete understanding, as soon as they log into the course site, of what they will need to know and do in order to succeed, and so that students are better able to manage their time. One teacher explained,

> I have course activities, assignments, and expectations about Discussion Board posts in folders by week so that the students know exactly what they are supposed to do and when. I've found that these [gifted] students really respond well to that. It lets them take responsibility for and ownership of their own learning, and that makes them all the more proud of what they accomplish in my course. (personal interview, November 18, 2009)

Many of the other differences noted by instructors with respect to the sorts of strategies employed to facilitate the student-content interaction in the online environment compared to regular bricks-and-mortar schools revolved around a common theme: namely, individualization and differentiation of content to address the varying ability levels, interests, learning styles, and study skills of students. As one teacher very succinctly put it, "In online teaching, one size need not fit all" (open-ended survey response, June 21, 2009).

One of the ways in which teachers individualized their courses according to a student's needs is by providing students the opportunity for self-pacing. All of the participating teachers noted that students who take online classes often do so precisely because of the flexibility it offers. Accordingly, many of the teachers said they posted "recommended" due dates/deadlines, but for the most

part allowed students to work through the course material at a pace that was appropriate to their learning rate and in keeping with their other commitments. Many teachers also specifically noted that in the online environment, they were more able to provide a variety of "options for extra investigation and presenting the material using different media" so the students "may be able to study and learn in a manner that best suits their own learning style" (open-ended survey response, June 21 and July 2, 2009).

Some of the other ways in which teachers said their online course was more individualized than their face-to-face course included having students complete a pre-assessment or interest survey at the beginning of the course; "gauging students' interests and goals for the course via phone" or e-mail; and conducting formative assessments of student progress at regular intervals throughout the course via individual phone conferences, surveys, and "progress reports" (open-ended survey responses, June 21–July 1). Instructors used these assessments to "tailor assignments to students' interests," "modify or create additional assignments for more challenge," and/or "provide some students with more guidance" or additional mentoring (open-ended survey responses, June 21–July 16, 2009). A number of teachers involved their students in this process so that "students could reflect on and evaluate their own strengths and weaknesses" (open-ended survey response, June 21, 2009).

In an online environment, with a format that lends itself to more self-directed and individualized learning experiences, nearly half of the participating teachers felt that learning was also more student-centered than in a traditional face-to-face classroom. One instructor said that she saw her role "less as someone who gives content or imparts knowledge to the student and more as someone who opens up doors for them to discover new content, new knowledge, new ways of solving the same problem—and to learn how to learn" (personal interview, November 19, 2008). Many reported that they gave their online students more choice in their assignments and control over the direction in which they took it. Several specifically mentioned that they incorporated into their online courses "self-directed research projects" in which stu-

dents were responsible for "defining and researching a problem of importance to them"; "authentic labs that used commonly found household items"; and/or assignments that required students to "apply the concepts they were learning to real situations" of particular importance or relevance to them (open-ended survey responses, June 23–July 16, 2009).

Stepping back for a moment from the specific strategies teachers used to facilitate student-content interaction, a number of teachers noted that they had been surprised to find online learning to be "more effective in most ways than the traditional classroom" (personal interview, November 19, 2009). The participating teachers offered a variety of reasons for this. Some teachers reported that students tended to be more thoughtful and contemplative in their online interactions than in a face-to-face classroom: "The e-mail conversation format gives students . . . time to reflect, word their ideas carefully, and send their reply after contemplation. The format provides for a reflective pace" (personal interview, October 29, 2008). A few instructors noted that this was also true of their own correspondence: "Online gives me the chance to think before responding, and to revise my response with care. This helps me be more specific, to make my response more personal to each student" (open-ended survey response, June 23, 2009).

Other teachers stated that without the usual limitations that came with teaching in a bricks-and-mortar school, they were able to place "more focus on the intellectual content and less on the institutional brouhaha" (personal interview, October 29, 2008). One teacher explained,

> I don't miss the huge vistas of wasted time that inevitably become reality in a face-to-face school context. . . . We're bell-free, too. No schedule restricts us to only 55 minutes—or demands we meet for a full 55 minutes. We meet and stay as long as needed in the virtual space. (personal interview, November 16, 2008)

Other respondents suggested that the flexibility of the online environment, in which students worked on their coursework at a time and place that suited them best, made their learning more effective: "The students' 'natural' rhythms work when they need to work and so do mine. This means we give each other our best selves b/c they don't have to look me in the eye at 7:15 a.m. and I don't have to read their papers at 3:15 p.m." (open-ended survey response, July 1, 2009). Another teacher thought the online experience was more dynamic and that students "were enjoying the process and delving more deeply into the content available online. With a click they could surf within the project's links and find out more and more" (open-ended survey response, June 21, 2009). Yet another hypothesized, "Online education requires more communication in writing, between student and teacher. The written word is permanent, personal, and thus, more effective (memorable)" (July 2, 2009).

Despite these very positive views of the effectiveness of online learning, some teachers did note some important challenges that they faced in their efforts to facilitate student-content interaction. First, more than half of the teachers noted that online learning requires a good deal of self-motivation and self-direction.

> The format and nature of an online course is not for everyone, even with the best of the best students. Online work requires a large amount of independent learning. . . . For those students who require near daily attention and hand-holding in order to thoroughly learn advanced, college-level material, frustration can set in. (open-ended survey response, June 21, 2009)

Also, some teachers noted that their inability to physically observe their students doing their work and solving problems made it difficult to catch subtle, but important, nonverbal clues that might indicate that there is some sort of conceptual misunderstanding on the part of a particular student.

> In my opinion, the biggest challenge in online versus classroom teaching has been not being able to see what a student is doing in, say, solving a problem, where the student may have a small conceptual problem that translates into missing a step in the solving process. In a physical classroom, I would be able to see this immediately as the student writes next to me, but for online classes, there is a delay in catching this problem. (personal interview, November 15, 2009)

Student-Student Interaction. In the interviews with teachers and the open-ended survey responses, strategies designed to facilitate student-student interaction were mentioned much less often than strategies designed to facilitate teacher-student and student-content interaction. When asked specifically about ways in which they provide their students with opportunities to interact and/or collaborate with peers, just under half stated that although they did provide these sorts of opportunities for student-student interaction, they did so to a limited degree because they were not convinced that their students desired such interaction. One instructor explained, "Sometimes students don't want to socialize but just want to focus on task at hand, especially if they are taking online courses because of convenience in face of other responsibilities/full schedules" (personal interview, November, 15, 2008). Another instructor noted that the course type, subject area being studied, and students' desire to self-pace, also played a role:

> In my experience, students who take on a college-level math or science course prefer to work independently and at their own pace, with some number wanting to work at an accelerated pace. When students are no longer working on the same material at the same time, it becomes more likely they see no need for communicating with each other, and prefer instead to keep contact with the instructor. Perhaps in other disciplines, student-to-student communication and discussion is more important,

> but in math/science, students prefer to work at individual pace. (open-ended survey response, June 23, 2009)

Similarly, another teacher stated: "Peer interaction and collaboration is valuable for younger students, because they may have different reasons and goals for taking courses online" (open-ended survey response, June 21, 2009).

Despite these doubts about the importance of student-student interaction, a majority of the respondents reported that they incorporated class discussion into their courses, primarily via discussion boards or e-mail listservs. Some of these instructors merely encouraged discussion, while others factored participation into students' grades. Other specific strategies reported for providing students with opportunities to interact and/or collaborate with peers included holding regular real-time class sessions using virtual classroom or web-conferencing technologies, creating an online class display board of student work/projects, using peer review of essays or projects, encouraging students to post their questions about specific problems on the discussion board and help each other work through them, creating class wikis or group weblogs, assigning whole class final projects/products, and establishing "study buddy" partners.

On the whole, instructors who had tried a variety strategies found asynchronous methods, in which, for example, students can post to or read discussion boards or wikis individually and at different times, to be more effective and easier to manage than synchronous methods, in which an entire group of students is online at the same time. For instance, one teacher stated:

> Finding times to arrange synchronous conversations with larger groups of online students is near impossible, because the students are also involved in sports, clubs and performance groups, family activities, and in some cases, students who take online classes are traveling. (open-ended survey response, June 29, 2010)

Instructors who used these methods reported that students were incredibly open and accepting of others in the online environment. Students, they believed, felt freer in the online environment to be themselves. One teacher reported:

> Even the most timid students were open and eager to communicate, almost joyous with the freedom to be themselves. No one was looking at them, assessing their appearance, or applying any of the other tests of belonging that sometimes hold a shy student back. (open-ended survey response, July 10, 2009)

In addition, several instructors noted that the online classroom was a more global and diverse environment, and when students were encouraged to interact with one another, everyone benefited from exposure to the variety of different viewpoints discussed and questions posed. Instructors also found considerable value in the role that student-student interaction played in developing a sense of community and "making students feel that they are a part of a larger classroom environment" (open-ended survey response, June 22, 2009). However, instructors also emphasized the importance of teacher presence in and facilitation of student-student interaction. One teacher explained, "I will sometimes enter a discussion and suggest avenues the discussion might take. I will contact students privately if they are not participating and try to encourage them to get more involved" (personal interview, October 29, 2008). Other teachers similarly noted that they were integral participants in discussions, especially with respect to "pushing students to think more deeply" or more critically about an issue and asking for evidence for students' claims (open-ended survey response, June 21, 2009).

Student Interviews and Student Surveys

The three broad categories that emerged in the teacher interviews and surveys (teacher-student interaction, student-content interaction, and student-student interaction) were also found to

be appropriate for grouping the students' responses regarding the instructional strategies they have found to be most effective in their online courses. Within each category, once again specific themes emerged. However, a number of these more specific themes were different, in both large and subtle ways, than the themes that emerged from the teacher interviews and survey responses. Moreover, some of the themes that emerged overlapped in important ways and even sometimes seemed to extend beyond the broader category under which they were grouped.

Teacher-Student Interaction. In responses to an open-ended question about the benefits of online learning, the majority of students spoke about the "one-on-one attention" that they received from their teachers (open-ended survey response, June 21, 2009). When asked what they thought were the most important attributes of an online instructor, the most common answer was "frequent" and "prompt" communication and feedback (also "responsiveness," "attentiveness," and "accessibility"). The majority of the students further stated that it was extremely important for communication to be clear and for feedback to be substantive. Several students explained that clear communication was particularly important because of the inability for online teachers to visually demonstrate what they were talking about. As one student wrote, an online instructor "needs to be able to keep in touch with their students, be able to be clear on instructions and projects, and explain things in a way they can understand without being there to show a student" (open-ended survey response, June 22, 2009). Many students also particularly appreciated feedback that was honest and that challenged them to do their best: "I, personally, really appreciate instructors that give me honest, but constructive, criticism about my work. The more a teacher challenges me, in general, the more I enjoy the class" (personal interview, December 2, 2008).

"Patience," "willingness to help," and "perseverance" were also perceived by a majority of students to be some of the most important attributes of an online teacher. One student explained,

> The most important attribute for an online instructor is patience. The instructors have been through the course before, and they know their way around the site. But the new students have no idea what they're doing. Especially since we're used to sitting in a classroom and learning, there are bound to be some misunderstandings. (open-ended survey response, June 21, 2009)

In addition, a large number of respondents said it was important for online instructors to be "encouraging," "caring," "supportive," "fair," "nice," "kind," and "friendly." In general, these students wanted online teachers who "make students feel like they care, know who you are, and care about your work" (open-ended survey response, June 24, 2009). Students valued teachers' efforts to "make a connection with [them] personally, which is one of the most important things for a student" (open-ended survey response, June 21, 2009).

Some respondents noted that it was this sense of connection that motivated them. For example, one student stated,

> It was really nice of my teacher to call me before I started my course, so that I could ask questions and get to know him. It makes me want to do my best, because I know something about the teacher I'm sending my assignments to. (June 22, 2009)

And another remarked,

> There is something very inspiring about the nature of the personalities of [two of my best instructors] in general. . . . They have a way of making me feel like they are in a classroom with me and that I know them pretty well but I don't how they do it. They are magical that way. (personal interview, December 5, 2008)

Other students noted that teachers' "enthusiastic" or "engaging" personality helped develop a sense of shared inquiry.

> In an AP English course, my teacher was very involved in the paper; she gave me helpful feedback right away and sent me resources regarding the topic even after the paper was finished. It wasn't just another assignment, it was something that interested us both that we both learned about through the assignment. (personal interview, December 9, 2008)

Some students, however, noted some challenges with respect to teacher-student interaction in an online classroom. Specifically, several noted that they missed knowing the instructors as people. For example, one student remarked, "It's hard not having the teacher there in person, or available all the time to ask questions. . . . My teacher seemed really nice and I would have liked to have met with her and my classmates" (personal interview, December 13, 2008). And a few noted it was hard "not having someone always there to drive and motivate you" (open-ended survey response, June 21, 2009). Some students noted that online, there were fewer opportunities for humor or for the conversation to go off on a tangent: "Regular classrooms are more entertaining. Regular classes can have entertaining/informative digressions" (open-ended survey response, June 28, 2009).

Student-Content Interaction. Among the most cited benefits of online learning were flexibility of scheduling and ability to self-pace. With respect to flexibility of scheduling, a common and representative response was: "I can take classes that my school doesn't offer, and I can work when I have free time or a lighter homework load in my school classes" (open-ended survey response, June 22, 2009). With respect to the ability to self-pace, one student wrote,

> Working at my own pace was one of the best things because at school I am often bored but with the online class I can move ahead whenever I want. Also, the material was not nearly as repetitive as the material I learn in school. Overall I was less bored with the online classes

> then regular classes. (open-ended survey response, July 18, 2009)

Another stated, "the rest of the class doesn't affect you as much, whereas in a normal classroom if one or two people don't understand then the entire class is held back" (open-ended survey response, June 26, 2009).

Another commonly cited benefit was the ability to learn on one's own terms, at one's own level, and to better develop independent learning skills. One student explained,

> One of the biggest benefits of learning online was that it taught me responsibility. There wasn't a teacher around reminding me to do homework or study for a test, so I was forced to make time for the learning myself. (open-ended survey response, July 1, 2009)

Another student stated: "One main benefit is that you and only you are solely responsible for how much you accomplish on the course" (open-ended survey response, June 24, 2009). Other students specifically noted that online learning allowed them to focus on the content of the course "in my home, with minimal distractions" and that there was "less hassle with busses, lockers, etc." and "less stress studying at home" (open-ended survey responses, June 21–June 25, 2009).

Students stressed the importance of an online teacher's ability to respond flexibly to individual needs and learning styles, "to adjust assignments to different students," and allow students "to learn by following our own interests" (open-ended survey responses, June 21 and July 2, 2009). One student specifically referred to a teacher who "has been really supportive in having me try to learn my own way and to really know how I learn and not just be another teacher" (open-ended survey response, June 23, 2009). Relatedly, a number of respondents believed it was important for instructors to "like to try new things and change how things are done," to "be open-minded," and to be "willing to let their students go outside the box" (open-ended survey responses, June 22–27, 2009).

Some students thought it was important for teachers to be experts in their field and passionate about the subject matter. One student wrote, "The online instructor should really understand the subject they are teaching and they should make it interesting and enjoyable too" (open-ended survey responses, July 6, 2009). Another stated, "They should share some experiences of themselves learning the course that they are teaching, which makes them more relatable" (open-ended survey response, June 30, 2009). Another student elaborated further:

> When people sign up for an online course, they're expecting someone more than the average teacher, someone a bit more specialized. They're expecting an expert . . . someone who is passionate about journalism, literature, or whatever the course is on. (open-ended survey response, June 21, 2009)

Student respondents noted two main challenges with respect to their ability to interact with and learn the content of their courses in an online environment. A little more than a third of the students who participated in this study said that one of the biggest challenges of the online learning environment is "not being able to have a teacher in front of you to ask questions" (open-ended survey response, June 22, 2009). "My teacher replies quickly," one student remarked, "but not as fast as in a classroom" (open-ended survey response, June 26, 2009). Some students specifically missed having a teacher look over their work as they were doing it: "The biggest challenge with a math course is knowing whether or not you have worked the problems correctly as you go" (open-ended survey response, June 23, 2009). Others also noted the difficulty in communicating their questions and receiving responses nonverbally. One student said,

> If I was confused, I had to figure out how to put it in words so I could e-mail the question, and then wait for a response that may come when I had already moved on to the next assignment. . . . In a classroom, if the student

> doesn't understand something, he can go to the teacher for an alternate explanation. With the online course, it was harder, and less visual, to do that. (open-ended survey response, June 22, 2009)

A second major challenge students noted with respect to interacting and learning content in the online environment relates to time management and self-motivation. One student commented that "you have to be motivated to do the assignments and study for the tests, because it's not like a normal class where you're there every day and you have deadlines" (open-ended survey response, June 21, 2009). Another student responded that one of the main challenges of the online environment was "Time Management!!!! As the girl who never has to study in regular school, devoting time to learning the information is a struggle" (open-ended survey response, June 27, 2009).

Student–Student Interaction. Only about one tenth of the respondents mentioned student-student interaction as either a benefit or challenge of the online environment. Among those that mentioned it as a challenge, half would have liked to have more student-student interaction and the other half would have liked to have less, mainly because it was difficult to schedule. One student stated that it was important for an online instructor to make the learning experience fun and that student-student interaction was part of making the experience enjoyable.

> One of my proctors made chats really fun. I got to know my other peers really well and we would all attend. It was a lot of fun and made me really enjoy the course. If proctors could make chats enjoyable as well as educational, it would really help me learn better. (open-ended response, June 21, 2009)

Quantitative Results

Both teachers and students were asked to rate various instructional practices and key characteristics of online learning environments, on a scale of 1 = *not at all important* to 5 = *essential*. Developing and maintaining a well-organized course site with clear expectations and instructions and providing students with opportunities to develop high-level critical and/or creative thinking skills was considered by both teachers and students to be critical to a successful learning experience (82% of teachers rated it as *essential* with the other 18% rating it as *very important*; 73% of students rated it as *essential*, 18% as *very important*). According to instructors, personalizing the learning experience was also integral to a successful online learning experience for gifted students (74% rated it as *essential*, 21% as *very important*). In addition, more than 60% of teachers believed that allowing students the flexibility to work at their own pace (68%), selecting appropriate course materials and resources (67%), and individualizing the learning experience (63%) were *essential*. By contrast, less than 40% felt that providing students with opportunities to interact and/or collaborate with peers (37%) or making use of multimedia and/or technological tools (26%) were *essential* for gifted students to have a successful online learning experience (see Figure 1).

In addition to a well-organized course site, student respondents felt flexibility to work at one's own pace (60% rated it as *essential*, 31% as *very important*) and the selection of appropriate course materials and resources (59% rated it as *essential*, 34% as *very important*) were vital to a successful online experience. They also rated a personal connection with the instructor (52% rated it as *essential*, 31% as *very important*) and opportunities to develop critical and/or creative thinking skills (47% rated it as *essential*, 32% as *very important*) highly. By contrast, only about a quarter of the student respondents thought using multimedia and/or technological tools (26%) and providing students with opportunities to interact and/or collaborate with peers (24%) were *essential* for gifted students to have a successful online learning experience (see Figure 2).

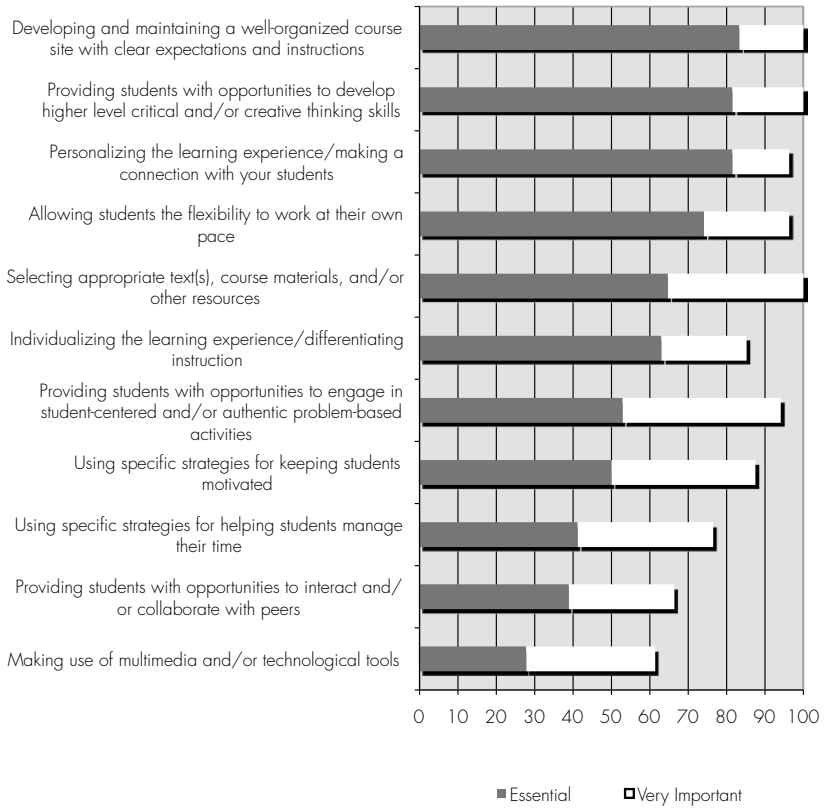

Figure 1. **Percent of teachers who believed the shown practices were essential or very important to a successful online learning experience.**

Independent-samples *t* tests were conducted to compare teachers' mean ratings of the importance of various practices for a successful online experience for gifted students by course type taught (enrichment vs. honors/AP). No significant differences were found between enrichment and honors/AP teachers' mean ratings of the importance of multimedia/technology tools or peer interaction. Significant differences were found, however, between the mean ratings of enrichment teachers and honors/AP teachers with respect to the importance of individualization/differentiation (M_E = 4.89, M_{HAP} = 3.56; t[25] = 2.87, p = .016) and opportunities for student-centered and/or authentic problem-solving

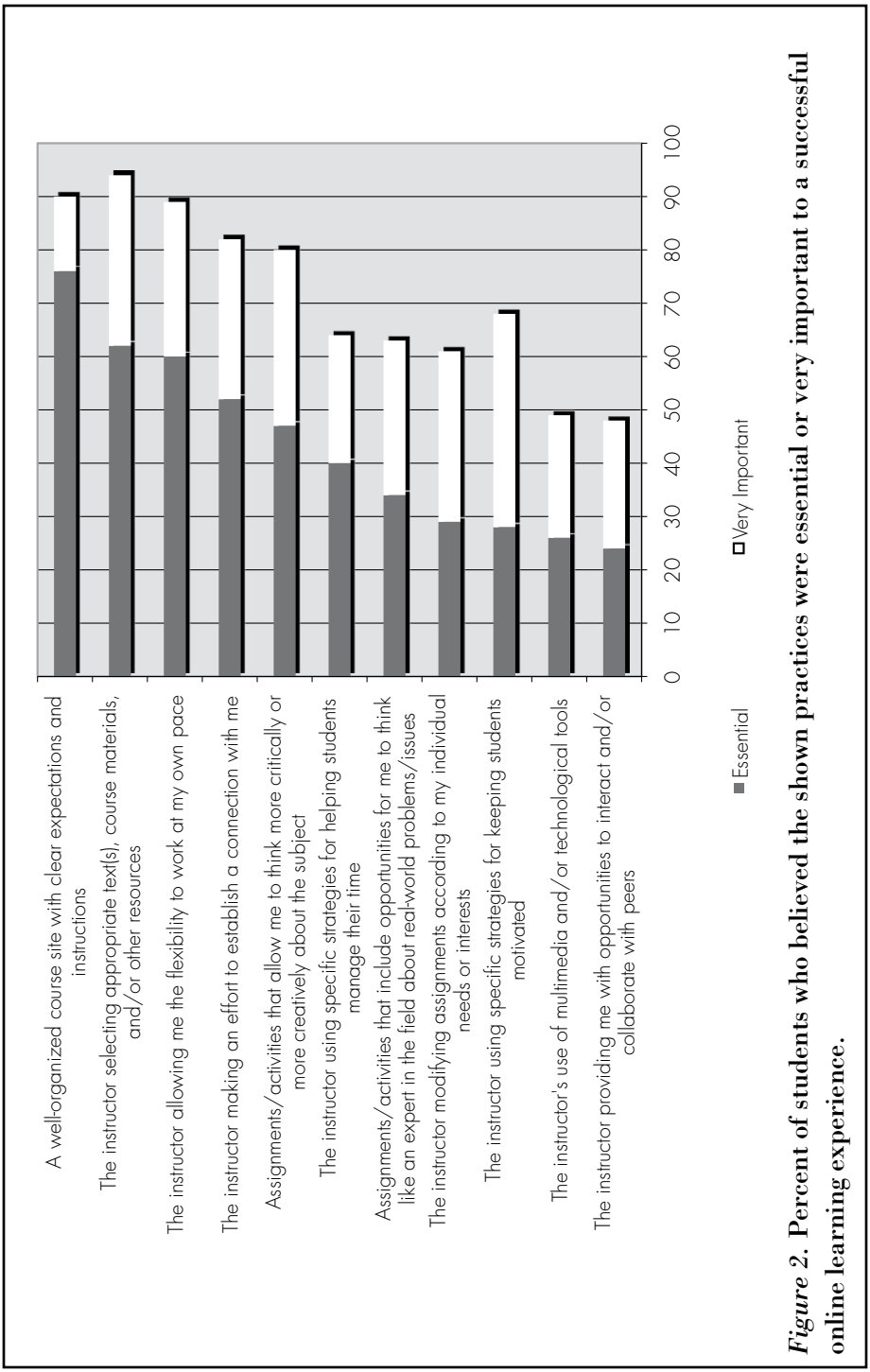

Figure 2. **Percent of students who believed the shown practices were essential or very important to a successful online learning experience.**

activities (M_E = 4.67, M_{HAP} = 4.11; t[25] = 2.13, p = .047), with enrichment teachers placing more importance on each of these items. The magnitudes of the differences in the means were large (eta squared = .340 and .221, respectively).

A comparison of enrichment and honors/AP students' mean ratings of the importance of various practices for a successful online experience was also conducted by means of independent-samples t tests. As was the case with respect to the teachers, no significant differences were found between enrichment and honors/AP students' mean ratings of the importance of multimedia/technology tools or peer interaction. Significant differences were found, however, between the mean ratings of enrichment students and honors/AP students with respect to the importance of opportunities for student-centered and/or authentic problem-solving activities (M_E = 4.46, M_{HAP} = 3.62; t[58] = 3.40, p = .015) and opportunities to think more critically and/or creatively (M_E = 4.64, M_{HAP} = 4.09; t[58] = 2.12, p = .038), with enrichment students more likely, on average, to perceive both of these items as more important. The magnitudes of the differences in the means were medium (eta squared = .099 and .072, respectively).

An independent-samples t test was also conducted to compare enrichment and honors/AP teachers' perceptions of whether online courses were less personalized and less individualized than traditional bricks-and-mortar classes. Enrichment teachers were significantly less likely, on average, than honors/AP teachers to find online courses less personalized (M_E = 1.00, M_{HAP} = 1.44; t[25] = 2.53, p = .035); the magnitude of the differences in the means was large (eta squared = .286). No significant differences were found with respect to perceptions of whether online courses were less individualized.

Teacher's mean ratings of the importance of various practices for a successful online experience by subject area taught (English/social studies/world languages vs. math/science/technology) were also conducted using independent-samples t tests. Significant differences were found between the mean ratings of English/social studies/world language teachers and math/science/technology teachers with respect to the importance of using specific strate-

gies for helping students manage their time (M_V = 4.46, M_M = 3.62; t[25] = 2.55, p = .021) and selecting appropriate materials and resources (M_V = 4.64, M_M = 4.09; t[25] = 2.52, p = .029), with English/social students/world languages teachers more likely, on average, to perceive each of these items as more important. The magnitudes of the differences in the means were large (eta squared = .289 and .306, respectively).

No significant differences were found in comparisons of teachers' mean ratings of the importance of various practices for a successful online experience for gifted students by years of online teaching experience and years of face-to-face teaching experience. Similarly, no significant differences were found in comparisons of students' ratings of the importance of various practices for a successful online experience by number of online courses taken.

Finally, comparisons of students' and teachers' ratings of the importance of various practices for a successful online experience were conducted using independent-samples t tests. On average, teachers placed greater importance on providing opportunities to develop critical and/or creative thinking skills (M_T = 4.82, M_S = 4.19; t[83] = 4.12, $p \leq .001$) and on providing opportunities for student-centered and/or authentic problem-solving activities (M_T = 4.39, M_S = 3.79; t[83] = 2.99, p = .004), when compared to students. The magnitudes of the differences in the means were medium (eta squared = .089) and small (eta squared = .058), respectively.

Discussion

The current research confirms that online learning can be a particularly good fit for many types of gifted students. As previous research (Olszewski-Kubilius & Lee, 2004; Ravaglia et al., 1995) has indicated, online learning provides expanded access to advanced-level coursework for students whose local schools are not able to offer such a variety of courses or do not have the resources for extended gifted programming, for students who are unable to take similar offerings at their local school due to

scheduling conflicts, and for students who would like to supplement their homeschool curriculum.

However, one of the greatest insights gleaned from the current research is that online learning not only allows students to take advanced courses that would otherwise not be available or accessible to them, it also opens up opportunities for new modes of learning. For example, many teachers and students talked about how the format of online learning seemed geared more toward the individual student, with a good deal of the instruction occurring by means of extended one-on-one e-mail "conversations" between teacher and students, which allows for much more flexibility in pacing and for the tailoring and personalization of the learning experience to better fit a student's needs and interests. Also, some teachers and students also noted that in the online environment, there was more of a laser-focus on learning without some of the distractions or limitations that were experienced in a regular bricks-and-mortar classroom. In addition, the online environment allowed time for a more reflective pace; students tended, in the online environment, to be more open and honest and "more themselves"; and the online format encouraged students to take more responsibility for and ownership of their learning and to take their learning further.

That is to say, the current research indicates that there are a number of benefits that the online environment can offer students above and beyond what the traditional classroom environment offers. As a result, instead of trying to recreate the face-to-face environment to whatever degree possible (e.g., through the use of cutting-edge technological tools and regularly scheduled real-time whole-group class sessions, neither of which were thought by most students or teachers to be essential to a successful online experience), online teachers and program administrators should, instead, try to capitalize on the unique benefits that the online environment can offer students. As one of the teachers interviewed so aptly put it,

> we don't necessarily want the online experience to mirror the face-to-face setting. There are certainly instructional

> strategies and practices that work in both settings. But we also want to be sensitive to the fact that online learning opens up new channels of learning. (personal interview, November 19, 2009)

In the context of this insight that the goal of developing and teaching an online course for gifted students may not necessarily be to try to recreate the face-to-face environment to the extent possible, but rather to capitalize on the benefits that the online environment can offer gifted students and also to minimize the challenges specific to the environment, the current research suggests that the following practices and strategies are important for facilitating a successful online learning experience for gifted students.

- *Developing and maintaining a well-organized course site.* Course sites should include clear expectations and detailed instructions for assignments, so that students know from the very first time that they enter the course site what they need to do in order to be successful in the course and how they are expected to go about doing it. In a face-to-face classroom, instructors often provide verbal instructions while handing out assignments, students are given a chance to ask questions (or give nonverbal clues that they are confused), and teachers can clarify, elaborate, offer examples, and specify where there may be some wiggle room in the assignments and where there is not. In an online classroom, the same details need to be provided but they need to be written out in advance, and care needs to be taken to anticipate potential questions and sources of misunderstandings and provide answers and clarifications in advance. It may also be necessary to revise the initial instructions as unanticipated questions arise throughout the course.
- *Establishing a pattern of frequent and prompt communication.* Both teachers and students also stressed the importance of the use of a positive and supportive tone in communications and of the instructor's efforts to establish a rapport of trust and level of comfort. Further, interaction with students should be both proactive and

responsive communication on the part of the instructor, and in the current study, a number of teachers emphasized a particular strategy that served them well in this regard: In conjunction with the more personalized, one-on-one e-mail conversations that they felt were so integral to the online learning experience, these teachers recommended the use of slightly more formal, proactive whole-class e-mails that served to establish teacher presence and authority, to reach out to students who are perhaps a bit shy and not in as regular communication with their instructors as they should be, to share important questions and discoveries that may have come up in conversations with individual students, and thereby to pull everyone into the conversation, establish more of a sense of community, a sense of shared inquiry, and a sense of the course as a dynamic shared enterprise.

- *Providing students with high-quality and appropriate resources, clear explanations of the material, and honest feedback.* Students in this study valued an instructor's selection of high-quality and appropriate resources, as well as his or her ability to make sense of the content covered in these resources. Despite the fact that the research on learning styles of gifted students indicates less preference for visual learning (Ricca, 1984), the gifted students in this study reported that one of the challenges of the online environment was the lack of visual demonstration. They appreciated teachers who were able to overcome this challenge through clear communication and the ability to explain important concepts using multiple and varied means (including visual aids).
- *Making an effort to get to know the students individually and establish a connection with them.* Time and time again throughout the interviews and surveys, teachers' and students' responses highlighted the incredibly powerful effect of teachers who took advantage of the more individualized, informal, and flexible nature of online learning in order to really get to know their students, their

overall academic strengths and weaknesses, and even the things they enjoy doing when they are not studying. Students in turn appreciated it when their instructors shared some of their own interests, their experiences with learning the subject matter in question, and their passion for the domain and for teaching in general. This, reported the students in this study, made their instructors more "relatable" and the courses more engaging and fun. It also allowed the teachers to make the learning experience more personal and meaningful to students and gave students a sense of their instructor's deep involvement in and commitment to their success, akin to that of mentors.

- *Individualizing the learning experience and differentiating the curricula.* Teachers and students alike perceived the individualization of the learning experience to be extremely important to facilitating a successful online learning experience. The ability to work through the material at a pace appropriate to one's learning rate and the flexibility with respect to scheduling was particularly important to students. A number of instructors also used both formal and informal preassessments and interest surveys to tailor assignments to students' interests. Students and teachers in this study further noted that the online learning environment was more geared toward student-directed learning and more conducive to instructors offering more choice in assignments, more opportunities for students to "discover" knowledge, more student-centered projects, more time for reflection, more opportunities for self-evaluation, and more opportunities for independent study and self-guided research on topics they wanted to pursue in more depth.

The results of this study are inconclusive with respect to the role of student-student interaction and the use of multimedia and technological tools in the facilitation of a successful online learning experience for gifted students. Although the literature on online learning in general and the literature on effective instruc-

tional practices for gifted students indicate that both student-student interaction and the use of varied means (often through technology) to present the content are key ingredients in meeting the needs of learners, less than 40% of the teachers and only about 25% of the students in this study rated either of these two items as essential to a successful online learning experience. However, these results may have also be influenced by the fact that the participating instructors and students may not have had much, if any, experience with other online learning programs, and their perceptions may have been influenced by the structure of the given program. This is a limitation of the present study. Another limitation of the current study is the 7% response rate among students. It could be that students who had had more positive experiences and whose needs were met within the given online program were more likely to respond. Further research needs to be conducted with gifted students who are not well-served by the online environment, especially with respect to how online learning environments for gifted students could be further improved.

Another limitation of the current study is that it is unclear whether instructors and students are able to assess, in the online environment, how different activities impact their learning in the same way that they would in a face-to-face setting. For example, there is a discrepancy between students' rating of the value of student-student interaction and use of technology to their online learning experience and some of their open-ended responses. That is, while teachers' and students' ratings indicated that student-student interaction and multimedia and technological tools are not viewed as essential to a successful online experience, some teachers' and students' open-ended responses indicated that both student-student interaction and multimedia and technology tools can be useful for certain purposes or when used in specific ways. For example, with respect to student-student interaction, teachers who provided students with substantial opportunities for peer interaction found that asynchronous interaction was generally preferred to synchronous interaction and allowed for more reflective responses; that teacher involvement in student-student interaction and discussion played a large role in its success; and

that students were incredibly open, honest, and accepting of others in the online environment. With respect to the role of the use of multimedia and technological tools, student open-ended responses indicated that this might be useful for the purpose of adding a visual and/or verbal element to explanations and discussions. Further research on a larger scale and involving multiple online programs is needed to better evaluate the role of student-student interaction and the use of multimedia and technological tools in effective online education for gifted students.

In sum, however, the present research indicates that online programming has great potential for gifted education. According to the teachers and students interviewed and surveyed in this study, the online format opens up a variety of opportunities for gifted students. Not only does it allow for access to advanced-level courses and the opportunity for gifted students to work at a pace consistent with their rate of learning, it also allows students to have more time to process, to feel more in control of the learning process, and to engage in more self-directed and independent learning. Furthermore, the online format is conducive to a more individualized and differentiated learning experience than is often possible in a regular classroom of 20–30 students. The more individualized experience may also lead to a more of a mentor-mentee relationship between teacher and student, in which there is a sense of shared inquiry and commitment to the student's overall success that has a lasting effect on the student. These benefits and others indicate that online programming is an effective means of meeting the needs of many gifted students. Indeed, the flexibility and individualization offered by the online format may be a way of expanding our reach to gifted students who face unique circumstances that make gifted programming in a regular bricks-and-mortar setting a less than ideal "fit" for their particular needs.

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Appendix A
Interview Questions

Teachers

- Tell us a little about yourself and how you came to begin teaching online.
- Briefly describe some initial thoughts about your experiences teaching online.
- Were there any "surprises" (pleasant or otherwise) when you first began teaching online?
- What are the pros/cons of teaching or learning online versus in a regular classroom?
- Do you think the online environment is a good match for gifted learners? Please explain.
- How do you structure your course and why? Do you structure it differently online than you would in a bricks and mortar classroom?
- How do you communicate with your students? What do you find most effective in this regard? How would you characterize these communications?

- Do you encourage interaction and/or collaboration among the students? If so, how? Do you think student-student interaction is important?
- How has online learning changed in the past several years, with the availability of new technologies such as virtual classrooms, whiteboards, blogs, video podcasts, etc.? Do you use any of these technologies in your course? What are the benefits and challenges of the various technologies (for you and/or for your students)? What technologies are most effective for given purposes and why?
- What are you proudest of in your courses or as an online teacher in general? Do you have any success stories to share? Challenging moments?
- Do you have any ideas for improving the online learning experience or directions you would like to see it go in?
- Any final thoughts/impressions?

Students

- Tell us a little about yourself and how you came to take this course online?
- Have you ever taken an online course before you came to GLL?
- What were some of your initial thoughts/expectations about what it would be like?
- Were there any "surprises" when you first began your course or did it pretty much fit with what you expected?
- How is an online course different than a regular class in school?
- What do you like most about online learning?
- Are there things about online learning that are more challenging than in a regular classroom?
- What are you proudest of with respect to your work in your online course?
- What projects/activities/assignments do you think challenged you the most?

- Do you think you have grown as a learner through this course or through online learning in general, and if so, how?
- Is there anything that one of your online instructors has done that has particularly inspired you? And/or, is there something that you thing they *could* do that would really inspire you to do your best as a learner?
- What do you think are the most important attributes of an online instructor?
- Do you enjoy communicating with other students?
- Any final thoughts/impressions about online learning or this course?