

# A review of online course dropout research: implications for practice and future research

Youngju Lee · Jaeho Choi

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**Abstract** Although online learning is expanding in availability and popularity, the high dropout rates remain a challenging problem. In this paper, we reviewed the existing empirical studies on online course dropouts in post-secondary education that were published during the last 10 years. We identified 69 factors that influence students' decisions to dropout and classified them into three main categories: (a) *Student* factors, (b) *Course/Program* factors, and (c) *Environmental* factors. We then examined the strategies proposed to overcome these dropout factors: (a) understanding each student's challenges and potential, (b) providing quality course activities and well-structured supports, and (c) handling environmental issues and emotional challenges. Finally, we discussed issues regarding dropout factors and strategies for addressing these factors and offered recommendations for future research.

**Keywords** Dropout factors · Online course · Strategies · Higher education · Future research

## Introduction

Online courses are attractive for students and teachers because they are not restricted by time and place. Moreover, with the rapid development of technology, the online learning industry is growing significantly. According to a recent report by the Sloan Foundation (Allen and Seaman 2008), online education enrollment has increased by 12% in 2008

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Y. Lee (✉) · J. Choi  
University of Virginia, Instructional Technology Program, Charlottesville, VA, USA  
e-mail: yl7g@virginia.edu

J. Choi  
e-mail: jc2st@virginia.edu

Y. Lee  
499 Seymour Rd, APT #7, Charlottesville, VA 22903, USA

J. Choi  
195 Wahoo Way, #522, Charlottesville, VA 22903, USA

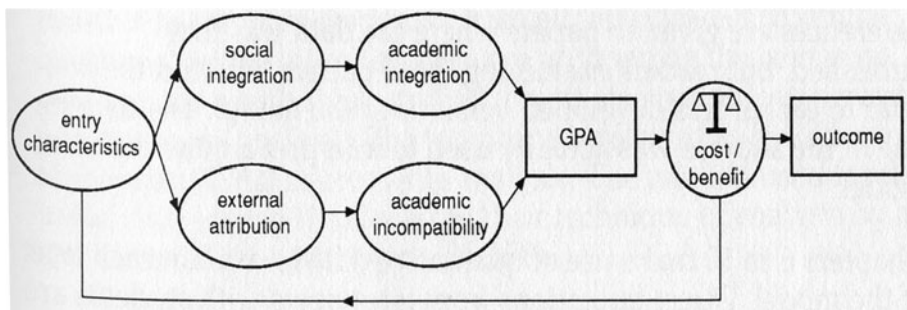
compared to the previous year, and almost four million students were enrolled in at least one online course during this period. However, although online learning has gained immense popularity and attention, recent studies indicate online courses have significantly higher student dropout rates than conventional courses (Carr 2000; Levy 2007; Tello 2007). This dropout rate is one of the greatest challenges facing online educators and administrators (Clay et al. 2009; Diaz 2002; Parker 1999).

The high dropout rate among students enrolled in online courses has long been regarded as a problem and concern for educators for several reasons. For students, failure in or failure to complete their first online course may lead to lower students' self-confidence or self-esteem and discourage them from registering for other online courses (Poellhuber et al. 2008; Moore and Kearsley 1996). For institutions, high dropout rates suggest that their online programs are ineffective and of poor quality (Willging and Johnson 2004). Additionally, some institutions with low retention rates have encountered a loss of profits and struggled to stay in business (Liu et al. 2009). If completion rates could be improved, institutions would make better use of resources without waste and administrators could plan budgets for future fiscal years more efficiently. Consequently, administrators would like to code and classify the reasons why students drop out in order to minimize attrition (Diaz 2002). Student attrition, however, is indeed a complex phenomenon, because it involves human behavior which varies over time (Woodley et al. 2001; Holder 2007). Tinto (1975) and Kember (1995) introduced theoretical models of dropout in traditional face-to-face and online course environments respectively. Both conceptualized that dropout is caused by two major failures: unsuccessful integration into the social life of the institution and/or unsatisfactory compatibility to the academic demands.

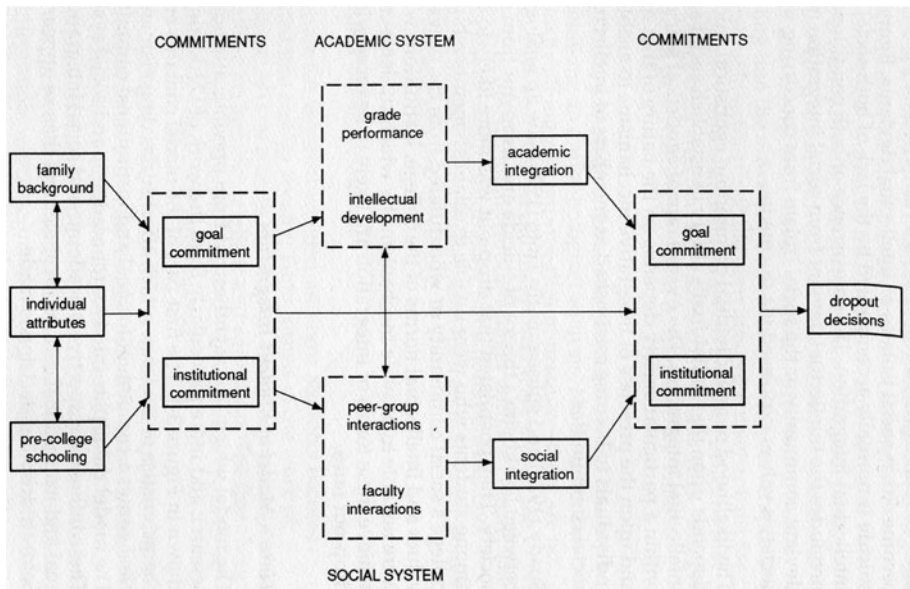
The purpose of this paper is to examine the factors influencing students to drop out of online courses offered by post-secondary educational institutes, to identify strategies to address them, and to discuss issues in the literature and provide recommendations for future research.

## Theoretical framework

Kember's model of dropout in distance education (1995) provides a useful framework for understanding persistence in online education courses. According to Kember's model, learners undergo two different types of learning paths: (1) social integration to academic integration and (2) external attribution to academic incompatibility (see Fig. 1). An adult



**Fig. 1** Kember's model of student progress in distance education (1995)



**Fig. 2** Tinto's student integration model (1975)

learner selects one of the two paths and finally comes to face the result of learning, which is GPA. After weighing between the cost of continuing to learn and GPA, individual learners make their own decision to drop out or continue.

Kember's model is based on the work of Tinto's student integration model (Tinto 1975) with traditional students, which is widely cited. Tinto suggests that dropout is more likely to occur among students who are unable to establish membership of the college's social community or who differed from the prevailing values and intellectual norms of the college (see Fig. 2). The first is social integration, which occurs through interaction with other members of society and leads to the formation of personal affiliations. The second is intellectual integration which results when there is sufficient commonality in values and beliefs with those of the relevant community.

According to Kember's model, students who have been less successful in the process of integrating study demands with social obligations, tend to attribute their integration failure to external factors which are essentially beyond their control. The negative social integration components in his model are subdivided into insufficient time, unexpected events, and distractions (Kember 1995). Students enrolled in distance education are normally part-time students. The home, social and work environment remain important in distance education as study normally takes place in the home and most students have a full-time job to complement or conflict with their study. Many students face quite a difficult time in trying to integrate study requirements with what appear to be conflicting demands from work, home, and friends (Kember 1995).

## Methods

To examine the dropout factors influencing students' decisions to drop out of online courses in post-secondary education, we analyzed existing studies from 1999 to 2009 that

reported empirical research findings in peer-reviewed journals. We selected a period of 10 years considering the evolution of online education.

That era is regarded as a time of drastic growth in online education; online courses become increasingly popular at colleges and business, primarily due to the advent of the Internet and World Wide Web after the mid-1990s (Harasim 2000).

Three of the most commonly used educational databases, Education Research Complete, ERIC, and PsycINFO, were accessed to search for relevant studies using several keywords in abstracts, such as “dropout,” “retention,” “persistence,” “attrition,” “withdrawal,” and “online,” in various combinations. We also employed the “snowball” method and reviewed the references in the selected articles for additional empirical studies. Initially, we identified 159 studies. Out of that total, we eliminated those studies that pertained only to (a) online classes in K-12 settings, due to their scarcity; (b) non-empirical studies, including conceptual papers or opinion papers because the assertions were not empirically proven; (c) doctoral dissertations or conference presentations which were not officially published in journals; and (d) magazines or research project reports which were not peer-reviewed. Although the quality of these studies met all criteria we established to include for our review, the studies were excluded when they did not directly address dropout factors or retention strategies in terms of the contents. Consequently, we selected and examined 35 empirical studies on students’ dropout in post-secondary online courses that were published within the last 10 years in peer-reviewed journals. We presented details of the reviewed studies in Table 1, including author (s), date of publication, research method, sample size, subject areas, and structures of the *course/Program* as well as the definition of dropout used in each study.

Using the research study categorization frameworks of Creswell (2008, p. 60), the 35 studies were categorized as follows: (a) 23 were correlational studies—examining the association or relation of one or more variables, (b) three were descriptive studies—exploring trends in attitudes, opinions, behaviors or characteristics of the population under considering, (c) two were experimental studies—assessing the impact of interventions, (d) four were qualitative studies—exploring participants’ experiences using textual analysis, and (e) three were mixed method studies—combining quantitative and qualitative data to explain a research problem. We first noted an unequal distribution of research designs in the reviewed studies on online course dropout factors. 77% of studies that we analyzed employed a correlational research design and there was little use of other research designs such as experimental, qualitative, or mixed methodologies. Mixed methods research is generally considered a powerful design because it builds on the strengths of both quantitative and qualitative data and thus enables researchers to develop a complex picture of social phenomenon, including both outcomes and the process (Greene and Caracelli 1997). However, we were able to identify only three studies employing a mixed research design.

Many of the studies (13 studies, 37%) we examined provided no clear definition of dropout from online courses. Furthermore, although some studies did explicitly define the term “student dropout,” their definitions were not consistent with one another, which made it difficult for us to compare dropout factors and retention strategies across universities. Some scholars focused on students’ active behaviors to withdraw (e.g., Frydenberg 2007; Levy 2007). For instance, Levy (2007) suggested that dropout students are those who voluntarily withdraw from e-learning after the add/drop period, thus acquiring financial penalties. Other scholars defined “dropout” simply as non-completion of a course, as indicated by a student’s final assessment—an incomplete or an “F” (e.g., Dupin-Bryant 2004; Liu et al. 2009). For example, Liu et al. (2009) defined retention as a completion of a course with a grade between a “C” and an “A,” thereby implying that any students who

**Table 1** Summary of reviewed studies

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Bocchi et al.	2004	Quantitative-descriptive study	88 graduate students, average age 30–35, having undergraduate degrees in business-related fields	Georgia Web MBA program (online MBA program) offered by 5 regional universities, consists of 10 courses and admits up to 35 students per cohort (a single program)	No definition provided
Castles	2004	Qualitative	12 undergraduate students	Open University courses of the UK (OUUK)	Dropout: students who had formally withdrawn, had left without notifying the university, or did not complete a course during a semester Dropout: students who were awarded fail or resit
Cheung and Kan	2002	Quantitative-correlational study	169 undergraduate students	Distance education course in Business Relationships and Communication at Open University of Hong Kong including self-instructional materials and 8 optional face-to-face tutorials (a single course)	No definition provided
Chyung	2001	Quantitative-experimental	139 graduate students	Online Master's degree courses offered by Boise State university (The Department of Instructional and Performance Technology)	No definition provided
Clay et al.	2009	Qualitative-experimental	57 undergraduate students	eCore courses using WebCT (100% online) at the University of West Georgia, part of the University System of Georgia	No definition provided
Drouin	2008	Quantitative-correlational study	71 undergraduate students	Three online sections of a middle-division undergraduate psychology course at a public university (a single course)	Retention: intention to take more online courses
Dupin-Bryant	2004	Quantitative-correlational study	465 undergraduate students	Online distance education courses during the spring semester of 2003 at Utah State University	Dropout: students who did not complete a course during a semester
Fennegan et al.	2009	Quantitative-correlational study	2,681 students (757 withdrawers, 595 non-successful completers, 1329 successful completers)	Completely online 22 courses/general education courses at the University System of Georgia. 22 courses were divided into three categories: English and Communication (EC), Social Sciences (SC), Science, Technology and Math (STEM)	Withdrawal: (1) withdrawers-had to withdraw from the course officially; (2) successful completers-completed the course receiving a grad of A, B, or C; (3) non-successful completers-received a grade of D or F or an incomplete

Table 1 continued

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Frydeberg	2007	Quantitative-descriptive study	2323 students (476 dropouts)	Online and on-ground professional education courses at the University of California, Irvine	Dropout: students who registered but dropped prior to class start, prior to start of instruction, during the orientation week, or after the orientation week No definition provided
Holder	2007	Quantitative-correlational study	259 undergraduate and graduate students (209 persisters and 50 non-persisters)	Online degree-completion programs in Adult and Professional Studies at a university in the Midwest US (associate's, bachelor's, or master's level in a broad range of areas, such as accounting, business administration, information services, criminal justice, nursing, management, and education)	
Ivankova and Stick	2007	Mixed method	278 graduate students	Distributed doctoral program in Educational Leadership in Higher Education (ELHE) at the University of Nebraska-Lincoln (a single program)	Dropout: students who withdrew or were terminated from the program
Kemp	2002	Quantitative-correlational study	121 undergraduate (57 completed, 64 dropped)	Undergraduate distance course offered at Athabasca University (single course)	Non-completion: students who did not commence work on their course, withdrew from their course, or received an academic failing grade
Levy	2007	Quantitative-correlational study	133 undergraduate and graduate students (25 dropouts, 108 completer students)	18 undergraduate and graduate e-learning courses from a college of business administration	Dropout-students are those who voluntarily withdraw from e-learning while acquiring financial penalties
Liu et al.	2009	Quantitative-correlational study	108 students (18.5% students dropped, 81.5% completed, 46.3% full-time employed, the majority seek an AA/As degree)	Online courses enrolled in varied areas including Mathematics, Science, Business, English, History, and Psychology at a community college in Maryland	Retention: enrolling in a course after the course census date (the end of add/drop period) and successfully completing the course with an A to C grade at the end of the term
Moore et al.	2003	Quantitative-correlational study	500 students (71 non-completers)	Totally asynchronous, semester-based instruction, 61 online courses) in 2000–2001 academic year at a community college in the Northeast US	Non-completion: students who received a grade of F or officially withdrew from the course

**Table 1** continued

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Morgan and Tam	1999	Qualitative	18 students (persistent 9, non-persistent 9)	Advanced Diploma of Horticulture course offered solely by distance learning (a single course)	Non-completion: students who did not enroll in the following semester
Morris et al.	2005b	Quantitative-correlational study	354 undergraduate students (70 withdrawers and 284 completers)	General education courses of the University System of Georgia (USG), fully online courses, three semesters for three courses: English Composition, US history, and Introduction to Geology	Withdrawal: students who completed the official withdrawal process. Non-successful completers: students who received a grade of D, F, or an incomplete
Morris et al.	2005b	Quantitative-correlational study	211 undergraduate students	eCore courses in general education (100% online) developed by the University System of Georgia	No definition provided
Muilenbrug and Berge	2001	Quantitative-correlational study	1056 students	Online distance education courses	No definition provided
Müller	2008	Qualitative-case study	20 female students from purposeful sampling (9 undergraduate students, 11 graduate students)	Online degree completion programs at a college in US (master's degree programs for teachers, guidance counselors, nurses, and administrators, bachelor's degree programs for teacher aides)	No definition provided
Osborn	2001	Quantitative-correlational study	501 undergraduate and graduate students	19 Distance learning courses at the University of North Texas during the summer and fall semesters of 1999. (undergraduate course 16% + graduate course 84%, web-based course 68.94%, videoconferencing course 31.06%)	No definition provided
Packham et al.	2004	Quantitative-descriptive study	44 students (15 completed, 26 dropped, 6 deferred), most students employed and averaged over 40 years	E-College Wales BA Enterprise program (a single program)	No definition provided

Table 1 continued

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Parker	2003	Quantitative-correlational study	95 college students and 4 instructors	Online and face-to-face courses at a community college in Arizona	No definition provided
Parker	1999	Quantitative-correlational study	94 undergraduate students	Undergraduate courses at Maricopia Community College District in Phoenix. (Three delivery modes: (1) $N = 21$ , Sociology, audiocassette mode, (2) $N = 41$ , English, computer conf, (3) $N = 32$ , English, correspondence mode)	No definition provided
Perry	2008	Qualitative	113 graduate withdrawers from the students admitted to the program in the years 1999–2004	Online graduate program in nursing and health studies at the Athabasca University (a single program in a university)	Withdrawal: centre withdrawal (student unable to fulfill the program requirement to complete two courses per year), academic withdrawal (students who fail two courses in the program), and student withdrawal (students who leave for reasons not obviously related to centre or academic requirements)
Pierrakeas et al.	2004	Quantitative-correlational study	338 undergraduate students and 108 graduate students	Two academic programs offered by the Hellenic Open University: (1) a 2-year Bachelors degree in Informatics program and (2) a 2-year Masters degree in Education (graduate students preparing teachers and teacher trainees) at the Open University in Greece	Dropout: including those students who enrolled in at least one module, but failed to deliver one project; who did not complete some or all of their assignment, but indicated they would continue their studies; who would not re-enroll at a future date; who enrolled in multiple courses, who had successfully completed some but not all of their assignments, and had indicated they would not re-enroll at a future date



Table 1 continued

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Pigliapoco and Bogliolo	2008	Quantitative-correlational study	57 college students	Online BS degree program in applied computer science (a single program)	Dropout: students who did not renew the enrollment at the end of the first year
Poellhuber et al.	2008	Mixed method	308 undergraduate students	Three undergraduate CMC (computer-mediated conferences) courses (Philosophy, French and Accounting)	Persistence: completion of all required assignments and taking the final exam regardless of the pass or fail verdict for the course No definition provided
Rolfe	2007	Mixed method	2000 students	Adult online educational courses in the field social sciences and humanities, Ontario, Canada	No definition provided
Rovai and Wighting	2005	Quantitative-correlational study	117 graduate students	Six online graduate-level educational research methods courses at a Christian University in Virginia, US (100% online)	No definition provided
Shin and Kim	1999	Quantitative-correlational study	1996 students (82% having a full-time job, broad age range from 18 to 59)	Distance education courses for 1 year from 16 academic department at the Open University in Korea	Dropout: students who fail to register after three consecutive terms of non-enrollment
Tello	2007	Quantitative-correlational study	1569 undergraduate and 51 graduate students, (714 persisters, 25 non-persisters)	76 online courses offered in the fall semester by the continuing education division of a public university	Non-persistence: students who filed paperwork with the Registrar's office declaring withdrawal from a course prior to the final grading period
Willging and Johnson	2004	Quantitative-correlational study	111 graduate students (83 completer, 28 dropouts)	Online master's program (9 course completion) offered by the Department of Human Resource Education (HRE) at the University of Illinois (100% online) (a single program)	Dropout: students who dropped out of the degree program after starting their first course

Table 1 continued

Author (s)	Year	Research method	Study population	Online course structure/subject	Dropout definition
Woodley et al.	2001	Quantitative-correlational study	427 students	Business school major courses at the Open University of UK (OUUK)	Dropout: unsuccessful students included those who failed the course assessment (the continuous assessment, the final examination, or both), those who withdrew voluntarily at any point after the course start, those who did not turn up to the final examination, and those not awarded a credit because they had infringed some university regulation
Xenos et al.	2002	Quantitative-correlational study	1230 undergraduate students	Open education programs in the field of computers (Course of Informatics—a 4 year course that comprises of 12 modules and leads to a Bachelor Diploma in Informatics. Each student may register for one to three models per year.)	Dropout: (1) Students who registered but never started their studies and did not re-register in the following year. (2) Students who started their studies and successfully completed some assignments or even some modules but decided to drop out for various reasons

did not complete a course with at least a “C” were considered as dropouts. In research on dropouts in open universities or distance education settings, students who simply did not register for classes for consecutive semesters were designated as dropouts (e.g., Bocchi et al. 2004; Morgan and Tam 1999; Pigliapoco and Bogliolo 2008; Pierrakeas et al. 2004; Xenos et al. 2002). A national open university in Korea employed a similar policy but employed a specific definition of dropout; learners were not regarded as dropouts until they failed to register for three consecutive terms (Shin and Kim 1999). Future studies, grounded in a clear, standard definition of the term, “dropout,” should be conducted in order to investigate dropout factors which prevail across different online courses.

With regard to the length of online courses in the reviewed studies, 34 (97%) involved semester-long courses. Only one study did not mention course length. In terms of class delivery format, Cheung and Kan’s study (2002) was exclusive in supporting the effectiveness of additional face-to-face classes to regular online courses in improving dropout rates. Online courses in the majority of studies employed 100% complete online classes. Although it may be possible that a different delivery format, degree of blending with face-to-face components or length of courses influence students’ persistence, we were unable to examine the comparative effectiveness on retention due to limited information suggested in the studies.

Finally, the quality of past research studies on online dropouts was limited in the generalizability of their findings. 26% of the studies (9 out of 35) were restricted to small sample sizes. Moreover, 29% of the studies (10 out of 35) were limited by their focus on a single online course or program which may result in selection bias. Therefore, the generalizability of their findings to other programs or institutions was questionable.

We employed different approaches to identify the online dropout factors in quantitative and qualitative research studies. With the quantitative studies, we identified the online dropout factors that were found to be statistically significant predictors of student dropout. We excluded those factors which past studies had consistently reported as insignificant. For instance, both Drouin (2008) and Pigliapoco and Boglio (2008) found that students’ perceived sense of community in online courses was relevant to student satisfaction, though not statistically related to either student achievement or retention, thus implying that a sense of community might not be an essential factor affecting online dropouts. With the qualitative studies, we included the online dropout factors which the authors asserted were the most prominent.

We did not include demographic characteristics, such as age, gender, or marital status, in our list of online dropout factors, because the findings of many studies were incompatible with one another regarding the relationship between demographics and online students’ persistence in online courses. For example, some researchers found no statistically significant differences in the overall dropout rates for students in different age groups (e.g., Cheung and Kan 2002; Osborn 2001; Tello 2007; Levy 2007; Willging and Johnson 2004) while others did (e.g., Xenos et al. 2002; Pierrakeas et al. 2004). Xenos et al. (2002) for instance, argued that older students are more likely to drop out and need more encouragement from tutors.

Likewise, there was also no conclusive correlation reported between students’ gender and their likelihood of dropping out of online courses. Some studies suggested that the dropout rates were not statistically different for men and women (e.g., Kemp 2002; Parker 1999; Tello 2007; Xenos et al. 2002), while other studies did find statistical differences in the performances of female and male students in online courses. For example, Packham et al. (2004) found that the majority of students who failed to complete courses were male. In summary, demographic characteristics have not been conclusively shown to

significantly contribute to performance differences in online courses. Rather, such differences seem to be influenced by other factors, such as students' time management skills, sense of values, communication patterns, and the subject of online courses. Therefore, demographic elements were excluded from our final list of dropout factors.

Ultimately, we identified a total of 69 dropout factors, of which 44 were unique, or non-overlapping, from the selected 35 empirical studies. We then employed a qualitative data processing approach, the *Constant Comparative Method* (Lincoln and Guba 1985). From the list of 69 factors, we randomly selected one factor and used it to represent the first category. Then we chose another factor and evaluated its similarity to the previous factor. If the second factor was not similar to the first one, the second factor represented a new category. Two authors in this study determined a similarity of factors to distinguish between categories. When confusion or disagreement occurred, a peer de-briefer also participated in discussions of coding uncertainties and interpretations as an external check. We repeated this process with successive factors until the categories were distilled into nine groups: (a) academic background, (b) relevant experiences, (c) skills, (d) psychological attributes, (e) course design, (f) institutional support, (g) interactions, (h) work commitment, and (i) supportive environment. The nine categories were then grouped into three main sections: (a) *Student* factors, (b) *Course/Program* factors, and (c) *Environmental* factors. Eventually, we ended up classifying the 69 online dropout factors into three main categories.

We also analyzed the strategies for improving retention rates for online course which had been either suggested or actually proven to be effective in the studies we reviewed. We identified 52 strategies to reduce the dropout rate in online courses. In order to provide a coherent description of these strategies, we classified them using the same categories we had used to classify the online dropout factors: (a) strategies to address *Student* dropout factors, (b) strategies to address *Course/Program* dropout factors, and (c) strategies to address *Environmental* dropout factors.

## Results

### Analysis of dropout factors

From the review of past empirical studies, 44 dropout factors were saturated from the 69 factors identified. We classified these 44 factors into three main categories: (a) *Student* factors, (b) *Course/Program* factors, and (c) *Environmental* factors. The three main categories contain a total of nine sub-factors (see Table 2).

#### *Student dropout factors*

*Student* factors were the most frequently mentioned variables in the reviewed studies, occupying 55% of the total number of identified dropout factors (28 out of 69 factors, see Fig. 3). We divided these *Student* factors into four subcategories, including "academic background" (9%, 6 factors), "relevant experiences" (10%, 7 factors), "relevant skills" (16%, 11 factors), and "psychological attributes" (20%, 14 factors).

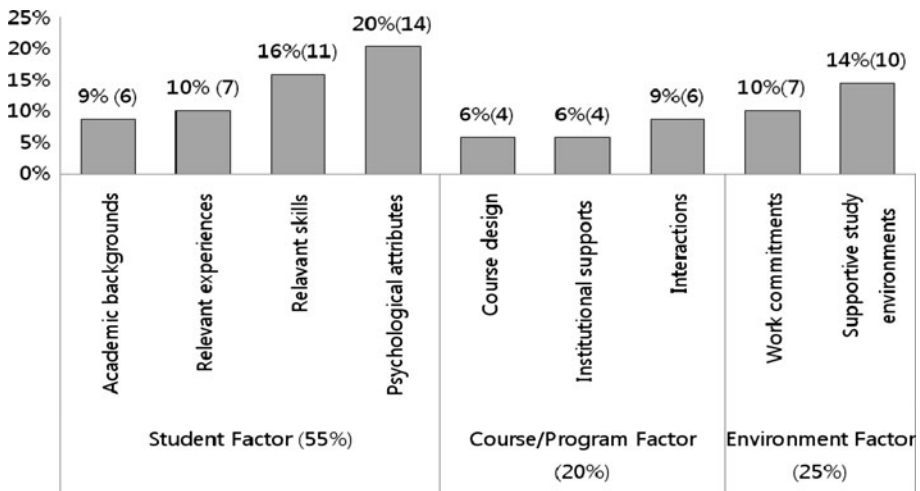
*Academic background* Academic background, which is defined as a student's academic aptitude and previous academic performance, showed significant negative correlations with

**Table 2** Summary of dropout factors

<i>Student factors</i>	
Academic background	<ul style="list-style-type: none"> <li>• GPA (Dupin-Bryant 2004), (Morris et al. 2005b), (Osborn 2001), and (Shin and Kim 1999)</li> <li>• Previous academic performance (Castles 2004), (Cheung and Kan 2002), and (Poellhuber et al. 2008)</li> <li>• SAT math score (Morris et al. 2005b)</li> </ul>
Relevant experiences	<ul style="list-style-type: none"> <li>• Educational level (Dupin-Bryant 2004), (Levy 2007), and (Osborn 2001)</li> <li>• Number of previous courses completed online (Dupin-Bryant 2004)</li> <li>• Number of previous distance learning courses (Cheung and Kan 2002) and (Osborn 2001)</li> <li>• Previous experience in the relevant field (Cheung and Kan 2002) and (Xenos et al. 2002)</li> <li>• Involvement in professional activities in relevant field (Xenos et al. 2002)</li> </ul>
Skills	<ul style="list-style-type: none"> <li>• Time management skills (Holder 2007), (Osborn 2001), and (Shin and Kim 1999)</li> <li>• Underestimation of the time required to balance their academic and professional obligations (Pierrakeas et al. 2004) and (Xenos et al. 2002)</li> <li>• Ability to juggle roles/balancing multiple responsibilities (Castles 2004) and (Müller 2008)</li> <li>• Strong coping strategies (Castles 2004)</li> <li>• Resilience (Kemp 2002)</li> <li>• Relevant prior computer training (searching the internet training, operating systems and file management training, and internet application training) (Dupin-Bryant 2004)</li> <li>• Computer confidence (Osborn 2001)</li> </ul>
Psychological attributes	<ul style="list-style-type: none"> <li>• Locus of control (Morris et al. 2005b), (Parker 2003), and (Parker 1999)</li> <li>• Motivation (Chyung 2001), (Ivankova and Stick 2007), (Osborn 2001), and (Parker 2003)</li> <li>• Goal commitment (Morgan and Tam 1999)</li> <li>• Love of learning (Castles 2004)</li> <li>• Self-Efficacy (Holder 2007) and (Ivankova and Stick 2007)</li> <li>• Satisfaction (Levy 2007) and (Moore et al. 2003)</li> </ul>
<i>Course/Program factors</i>	
Course design	<ul style="list-style-type: none"> <li>• Team-building activities (Bocchi et al. 2004)</li> <li>• Program quality (Well-structured, relevant content), (Ivankova and Stick 2007) and (Perry et al. 2008)</li> </ul>
Institutional supports	<ul style="list-style-type: none"> <li>• Administrative support (Muilenbrug and Berge 2001)</li> <li>• Student support infrastructure (Clay et al. 2009) and (Ivankova and Stick 2007)</li> <li>• Orientation (Clay et al. 2009) and (Frydeberg 2007)</li> <li>• Tutorial attendance (Cheung and Kan 2002)</li> </ul>
Interactions	<ul style="list-style-type: none"> <li>• Inter-student interaction (Pigliapoco and Bogliolo 2008) and (Tello 2007)</li> <li>• Faculty interaction with students (Bocchi et al. 2004) and (Ivankova and Stick 2007)</li> <li>• Student participation (Morris et al. 2005a)</li> </ul>

**Table 2** continued*Environment factors*

Work commitments	<ul style="list-style-type: none"> <li>• Employment status (Packham et al. 2004)</li> <li>• Work commitments (Kemp 2002), (Perry et al. 2008), and (Tello 2007)</li> <li>• Increased pressure of work (Packham et al. 2004)</li> <li>• Changes in work responsibilities and environments (Perry et al. 2008) and (Pierrakeas et al. 2004)</li> </ul>
Supportive environments	<ul style="list-style-type: none"> <li>• Financial aid (Morris et al. 2005b) and (Parker 1999)</li> <li>• Support from family, work, friends (Castles 2004)</li> <li>• Emotional Support (Holder 2007) and (Ivankova and Stick 2007)</li> <li>• Supporting environments allowing study time (Shin and Kim 1999) and (Osborn 2001)</li> <li>• Life circumstances (Perry et al. 2008)</li> <li>• Life challenger (Castles 2004)</li> <li>• Life events (Frydeberg 2007)</li> </ul>

**Fig. 3** Relative frequency with which various dropout factors were mentioned in previous studies

dropout rates. Students who received lower SAT scores, GPAs, or other academic performance scores showed higher dropout rates than those with higher scores. For instance, Morris et al. (2005b) found that high school GPA and SAT math scores were important predictors of undergraduate students' persistence in online general education courses. Similarly, Dupin-Bryant (2004) examined students' entry variables in online distance education courses and revealed a positive correlation between students' previous GPAs and their completion of online courses (cf. Osborn 2001; Shin and Kim 1999). Students' previous academic performances, measured by the number of courses completed, was also positively correlated with students' persistence in online courses (Cheung and Kan 2002; Dupin-Bryant 2004). These studies generally indicate that students with greater academic aptitude and a history of higher levels of academic achievement were less likely to drop out of courses or programs. In addition, in their comparison study of online courses and

corresponding conventional courses, Poellhuber et al. (2008) found that more students (50%) in online courses had previously failed the same courses than the students (25%) in conventional courses. Furthermore, among 60 online students who had previously failed a course, 31 (approximately 50%) had previously failed the same course at least two times. These findings indicate that students' academic background influences their decisions to enroll in online courses as well as their academic performance and persistence in those courses. In other words, students with less academic aptitude and a history of poor academic performance are more likely to enroll in online, rather than conventional, courses but less likely to persist in them.

*Relevant experiences* Students who had previous experiences relating to the contents of a course, or who have attended to higher education courses, were more likely to complete the course. Regardless of the quality of the students' performance in such experiences, successful students and dropout students in e-learning courses differed significantly with regard to the amount of academic and professional experience they had prior to taking online courses. Levy (2007) revealed that students with a higher level of education and/or more years of schooling were less likely to drop out of courses than their peers. Other researchers also found that the number of previous online courses completed was an important predictor of dropout (Cheung and Kan 2002; Dupin-Bryant 2004; Osborn 2001). Xenos et al. (2002) examined the previous academic and professional experience of 1,230 students in Informatics courses. Students who had completed previous courses in the field of Informatics or had been involved in professional programming or data processing activities had significantly lower dropout rates than students without such experiences (cf. Cheung and Kan 2002). Moreover, students with less academic and professional experience, such as first year students, tended to drop out more frequently than those with more experience.

*Relevant skills* In addition to a student's prior experience in areas relevant to a course, their academic or technical skills were examined for any possible correlation with their decision to drop out. The reviewed studies dealt primarily with two major skills: management skills and computer skills. The management skills included the ability to estimate the time and effort required for a task (Pierrakeas et al. 2004; Xenos et al. 2002), to manage time effectively (Holder 2007; Ivankova and Stick 2007; Osborn 2001; Shin and Kim 1999), to balance multiple responsibilities (Castles 2004; Müller 2008), and to cope with threats or crises during courses (Castles 2004; Kemp 2002). Research on those managing skills indicated that they were significant predictors of successful academic performance in and completion of online courses. In addition, Dupin-Bryant (2004) revealed that a lack of computer skills relevant to the delivery format or content of online courses, such as Internet searching, file management, Internet applications, and computer operating systems, was a critical indicator of dropout. The reviewed studies thus indicated that if students have general academic skills and relevant technical skills, they may feel more encouraged to complete online courses.

*Psychological attributes* Psychological attributes were the most frequently researched sub-category of factors in reviewed studies, occupying 20% of all the factors considered. Psychological attributes encompass various aspects of students' attitudes towards learning in general, towards particular courses, and towards their interaction with their instructor and other students. More specifically, the psychological attributes concern a student's locus

of control, motivation, self-efficacy, satisfaction with courses and instruction, and confidence. The locus of control is an individual's perception of what causes or influences outcomes. For instance, individuals with an internal locus of control believe that their own behaviors cause outcomes. On the contrary, people with an external locus of control believe that other people, the environment, or unexpected events (anything but themselves) cause outcomes (Rotter 1966). Students who have high internal locus of control are the most self-motivated and self-regulated. A student's internal locus of control was found to be a positive indicator of their persistence in and successful completion of online courses by Morris et al. (2005b) and Parker (1999, 2003).

On the other hand, several studies indicated a significant correlation between students' motivation and their successful completion of individual online courses as well as their retention in online programs (Castles 2004; Chyung 2001; Ivankova and Stick 2007; Osborn 2001). For instance, Osborn (2001) surveyed 501 undergraduate and graduate students at the University of Texas, examining the factors that influenced students' academic performance and their decisions to drop out. Motivation was measured by questions about each student's attitude towards their learning goals, homework, and interaction with peers. Discriminate analysis revealed that students' motivation significantly predicted their decision to drop out (Osborn 2001). Similarly, Castles (2004) interviewed undergraduate students who dropped out of online courses and found that their level of motivation for learning was an important factor in their dropout decisions. In contrast to other studies which examined students' perceptions through surveys, Chyung's (2001) study examined the impact of an instructional design model, which instructors implemented to improve students' academic performance and course dropout rates in online master's degree courses. Providing guidelines for the design of course curriculum, instructional materials, evaluation, and interaction between students and instructors, the instructional model emphasized students' satisfaction with online courses and focused on the reinforcement of motivation. Implementation of the instructional design model significantly improved students' dropout rate. This study provided empirical evidence for instructors focused on motivation in online courses.

Results of other studies of online course dropout indicated a positive correlation between course completion and other psychological attributes: students' self-efficacy (Holder 2007; Ivankova and Stick 2007), satisfaction with online courses and faculty (Levy 2007; Moore et al. 2003; Müller 2008), attitude both toward the course and toward their interactions with their peers and instructors (Tello 2007), and confidence in their ability to use a computer (Osborn 2001). Thus, the studies on students' psychological attributes revealed that students who had an internal locus of control and/or higher levels of self-motivation, self-efficacy, satisfaction with courses, and confidence in their computer skills were more likely to complete online courses.

### *Course/Program dropout factors*

We classified factors related to course design and implementation as well as institutional supports as *Course/Program* factors, which occupied 20% (14 out of 69 factors) of all the factors considered. Three sub-categories of *Course/Program* factors were identified: course design (6%, 4 factors), institutional supports (6%, 4 factors), and interactions (9%, 6 factors).

*Course design* Course design was examined in terms of interactivity, overall quality, and relevance to students' needs. For instance, Bocchi et al. (2004) revealed that team-building



activities contributed to high retention rates in a web-based MBA program by increasing interactions between teachers and students. In addition, in cases where students thought that courses were well-structured with relevant course content, students showed a higher persistence rate (Ivankova and Stick 2007). Furthermore, the relevance of a course to a student's career aspirations and learning style was a significant predictor of a student's decision to drop out of or persist in online courses (Perry et al. 2008). Those studies suggested that a well-designed course could decrease students' dropout rate in online courses.

*Institutional supports* A systematic support system seemed to improve student persistence rates in online courses. In their factor analysis study of barriers to distance education, Muilenburg and Berge (2001) identified a model of ten factors that explained 52% of data variances. Five of ten factors were related to institutional supports: administrative structure, faculty compensation and time, evaluation/effectiveness, access, and student-support services. When these factors were insufficient or unsatisfactory, they became barriers for students, challenging them in their efforts to complete the course. Those barriers were assumed to influence students' dropout decision. Ivankova and Stick (2007) and Clay et al. (2009) confirmed this assumption through telephone interviews with students who dropped out of online courses. Cheung and Kan (2002) examined eight tutorial sessions, a kind of optional instructional support for online students consisting of face-to-face sessions. During the sessions, students received both emotional and academic support. The results showed that attendance at tutorial sessions significantly increased students' persistence rates in online courses. Likewise, Clay et al. (2009) provided online advisor counseling and a web-based orientation to undergraduate students before their enrollment (cf. Frydenberg 2007). As a result of this intervention, the rate of persistence in online courses was significantly improved. These findings advocated systematic and institutional approaches to higher dropout rates in online courses than in face-to-face courses.

*Interactions* Interaction factors included students' interactions within classrooms, their level of involvement in learning communities, and the faculty's efforts to increase interactions and students' involvement in learning activities, such as an online discussion board, a blog, or Wikipedia. Three types of interactions within classrooms were explored with regard to their effects on students' persistence in online courses: (1) student-to-student, (2) student-to-teacher, and (3) student-to-content. Tello (2007) and Pigliapoco and Bogliolo (2008) examined the influence of peer interactions on students' decisions to dropout of online course and found no significant relation between peer interactions and dropout rate. However, Ivankova and Stick (2007) and Bocchi et al. (2004) revealed significant correlation between faculty-student interaction and online dropout rates. If faculty gave timely and appropriate feedback, involved students in interactive activities, and promptly provided supports to struggling students, then students were more likely to persist in online courses (Ivankova and Stick 2007). Morris et al. (2005a) examined interactions between students and course content by measuring the frequency and duration of students' use of online content. As a result, completers showed significantly higher participation in learning activities than withdrawers in three measurements: the number of discussion posts viewed, the number of content pages viewed, and the number of seconds viewing discussions. From the results of reviewed studies, students who actively participated in learning interactions, especially with teachers and contents, were more likely to complete and retain in online courses.

### *Environmental dropout factors*

*Environmental* factors occupied 24% of all identified factors (14 out of 69 factors). Many students who dropped out of online courses attributed their decision to *Environmental* factors, including work commitments, various family and social responsibilities, and insufficient supports from family, friends, or colleagues. Consequently, *Environmental* factors fell into two sub-categories: work commitments (10%, 7 factors) and supportive study environments (14%, 10 factors).

*Work commitments* Most students enrolled in online courses were part- or full-time workers who had to manage their time and energy to meet both work and study obligations. Full-time employee status, increasing pressure to work additional hours, or changes in work responsibilities raised the likelihood that students would drop out (Kemp 2002; Packham et al. 2004; Perry et al. 2008; Pierrakeas et al. 2004; Tello 2007).

*Supportive study environments* The level of support students received from others was an important predictor of their persistence in online learning. Family, friends, employers, and colleagues can provide many kinds of positive support to help students succeed in online courses: emotional support (Holder 2007; Ivankova and Stick 2007), financial aid (Morris et al. 2005a; Parker 1999), and comfortable circumstances in which to study (Castles 2004; Osborn 2001; Shin and Kim 1999). If students faced life challenges and unexpected life events without sufficient support from others, their likelihood of dropping out increased (Castles 2004; Frydenberg 2007; Perry et al. 2008).

### Analysis of strategies to overcome online dropout

Strategies to improve students' persistence in online courses were presented in our reviewed studies in the form of suggestions and case study results. We classified these strategies into three categories that correspond to the categories of dropout factors: (1) understanding of each student's challenges and potential, (2) providing quality course activities and well-structured supports, and (3) handling environmental issues and emotional challenges (see Table 3).

#### *Understanding each student's challenges and potential*

Strategies to overcome *Student* factors involved understanding and addressing both students' challenges and their potential when designing curriculum and instruction and establishing a support system. For instance, many researchers in the reviewed studies proposed diagnostic procedures for assessing students' computer skills (Ivankova and Stick 2007; Liu et al. 2009; Müller 2008; Rolfe 2007), English language proficiency (Ivankova and Stick 2007; Müller 2008; Rolfe 2007), and locus of control (Parker 2003) before starting class. The diagnoses would provide essential information about students' entry characteristics. Then, depending on the students' preparedness for online courses, instructors and administrators could design customized lessons and provide a supportive system to meet students' needs. The results of diagnostic tests would also present useful information for the next group of strategies. Rolfe's (2007) study integrated a diagnostic test of students' skills with online course instructions and showed a positive utilization of the information to reduce dropout rate.

**Table 3** Summary of strategies to overcome dropout factors

Dropout factors	Strategies
<i>Student factor</i>	Understanding of each student's challenges and potentia
Academic background	<ul style="list-style-type: none"> <li>• Provide high quality and responsiveness of academic advising (Ivankova and Stick 2007)</li> </ul>
Relevant experiences	<ul style="list-style-type: none"> <li>• No strategies currently mentioned in the studies reviewed</li> </ul>
Skills	<ul style="list-style-type: none"> <li>• Pre-assess students' skills (Rolfe 2007)<sup>a</sup></li> <li>• Administer the diagnosis of students' basic skills (e.g., writing, computer, mathematics, and critical thinking) before course registration and offer remedial courses or technical training if necessary (Müller 2008)</li> <li>• Provide computer training (Dupin-Bryant 2004)</li> <li>• Ensure that students are comfortable with technology and have good writing skills (Ivankova and Stick 2007)</li> <li>• Utilize a battery of autonomous assessment tools that can be scored immediately using computer adaptive assessment (Liu et al. 2009)</li> </ul>
Psychological attributes	<ul style="list-style-type: none"> <li>• Operate a screening procedure to determine students' locus of control (Parker 2003)</li> </ul>
<i>Course/Program factor</i>	Providing quality course activities and well-structured supports
Course design	<ul style="list-style-type: none"> <li>• Limit the class size to 20 students (Rolfe 2007)<sup>a</sup></li> <li>• Offer a cohort- and team-based learning experience with extensive faculty feedback and interaction (Bocchi et al. 2004)<sup>a</sup></li> <li>• Provide content which is relevant to students' experiences and interests (Bocci et al. 2004)<sup>a</sup>, (Ivankova and Stick 2007)</li> <li>• Make course content flexible and self-directive for students to access and explore (Bocchi et al. 2004)<sup>a</sup>, (Ivankova and Stick 2007), (Morris et al. 2005a), (Müller 2008), and (Perry et al. 2008)</li> <li>• Make curriculum more interesting and interactive to encourage student participation (Morris et al. 2005a)<sup>a</sup>, (Müller 2008), and (Pigliapoco and Bogliolo 2008)</li> <li>• Reinforce a teacher's role as a facilitator of interactive learning (Bocchi et al. 2004)<sup>a</sup>, (Clay et al. 2009)<sup>a</sup>, (Ivankova and Stick 2007), (Müller 2008), and (Tello 2007)</li> <li>• Increase interaction in classroom using communication technology tools (Poellhuber et al. 2008)</li> </ul>
Institutional support	<ul style="list-style-type: none"> <li>• Identify at-risk students and provide them with appropriate training opportunities and guidance (Dupin-Bryant 2004), (Perry et al. 2008), and (Pierrakeas et al. 2004)</li> <li>• Provide student orientation programs including training in the use and application of Internet technologies (Dupin-Bryant 2004), (Holder 2007)</li> <li>• Utilize advisers or tutors to support students (Castles 2004), (Clay et al. 2009)<sup>a</sup>, (Perry et al. 2008), and (Pierrakeas et al. 2004)</li> <li>• Provide staff trainings to qualify them to provide guidance and support in online courses to qualify them (Castles 2004), (Müller 2008)</li> <li>• Establish institutional student support infrastructure (Castles 2004), (Ivankova and Stick 2007), and (Müller 2008)</li> </ul>

**Table 3** continued

Dropout factors	Strategies
Interactions	<ul style="list-style-type: none"> <li>• Use technological tools to facilitate and promote peer interaction (Poellhuber et al. 2008)</li> <li>• Create online interaction forums that are compatible with these motivations to increase student–student interaction within an online course (Drouin 2008)</li> <li>• Monitor students' involvement in learning activities and their continuous progress (Castles 2004)</li> <li>• Encourage extensive faculty feedback and interaction (Bocchi et al. 2004)<sup>a</sup></li> <li>• Develop online learning community (Ivankova and Stick 2007) and (Liu et al. 2009)</li> </ul>
<i>Environment factor</i>	Handling environmental issues and emotional challenges
Work commitment	<ul style="list-style-type: none"> <li>• No strategies currently mentioned in the studies reviewed</li> </ul>
Supportive environment	<ul style="list-style-type: none"> <li>• Use questionnaires to ascertain students' level of maturity and life challenger status (Castles 2004)</li> <li>• Identify students as early as possible who might be more at-risk for excessive personal demands (Perry et al. 2008)</li> <li>• Have advisers trained to counsel students at a personal level (Castles 2004)</li> <li>• Provide counseling services that respond to emotional and health issues to meet students' need to feel socially connected not only to peers and faculty but also to staff at the institution (Müller 2008)</li> <li>• Supply resources to ease the trauma involved in dropout decision when a student comes to the conclusion that withdrawal is indeed the best action to take (Perry et al. 2008)</li> </ul>

<sup>a</sup> These studies provided empirical evidence of suggested strategies

### *Providing quality course activities and well-structured supports*

Course design was a primary focus of many strategies proposed or assessed in the reviewed studies. Course design includes the curriculum, content and materials, delivery methods, learning activities, type and degree of interaction and communication during courses, and class management. Although both face-to-face and online courses require excellent course design for learning to be effective, their criteria for course design are quite different. Online students have different needs and characteristics than their peers in conventional classroom settings, and course design should address their differences. Responding to the specific needs for online courses, the reviewed studies suggested strategies for interactive and interesting learning, effective presentation and delivery of course content, and productive communication.

Interactive and interesting learning activities, such as team-based learning, were highly recommended to increase students' motivation and thus foster students' learning (Bocchi et al. 2004; Morris et al. 2005a; Pigliapoco and Bogliolo 2008). Bocchi et al. (2004) and Ivankova and Stick (2007) proposed that course content should be relevant to students' experiences and interests because activation of the students' background knowledge and their interests would motivate them to actively participate in learning. For effective delivery of information, the presentation format of course content should be interactive,

flexible, and self-directive to enable students to access and understand the content more easily (Bocchi et al. 2004; Ivankova and Stick 2007; Morris et al. 2005a; Müller 2008; Perry et al. 2008). In addition, teachers' roles were emphasized in the reviewed studies to promote productive communication and interaction between students and teachers. Many researchers argued that the teacher's role was to facilitate effective communication and interactive learning within classes by providing easily accessible communication methods, timely responses to students' questions and work, and adequate and systematic supports to students (Bocchi et al. 2004; Clay et al. 2009; Ivankova and Stick 2007; Müller 2008; Tello 2007). Researchers also offered several suggestions for reinforcing effective interactions, including using communication technology tools (Poellhuber et al. 2008), monitoring students' involvement and progress (Castles 2004), increasing the amount of faculty feedback (Bocchi et al. 2004), increasing student–student interactions (Drouin 2008; Ivankova and Stick 2007; Pigliapoco and Bogliolo 2008), encouraging the development of an online community (Ivankova and Stick 2007; Liu et al. 2009), and limiting class size to 20 students (Rolfe 2007).

Many suggestions in this section were evidenced by empirical research results. For instance, Bocchi et al. (2004) surveyed 88 students of an online MBA program and found significant factors of retention. Morris et al. (2005a) investigated 354 students' academic performance and persistence rates in undergraduate online courses for three semesters. Specifically, Clay et al. (2009) and Rolfe (2007) applied improvement plans for students' persistence in online courses and effective interventions were suggested with positive results in undergraduate online courses.

Although these suggestions for the design of online courses were in keeping with the general principles of traditional course design, the practical features of course design should be more specific to online courses. For instance, Poellhuber et al. (2008) revealed that a collaborative learning model, which aimed to increase interaction between students, did not demonstrate any impact on students' persistence in online courses. The results were assumed to be caused by the fact that many students who enrolled in online courses preferred self-paced, individualized learning of online education and were not interested in or accustomed to collaborative learning activities. Therefore, to increase meaningful interaction between students in online courses, interactive learning activities also need to be appealing to online students' characteristics, such as utilizing asynchronous discussion boards (cf. Morris et al. 2005a). However, most suggestions were quite general in nature; indeed, few suggestions came with any practical guidelines for their application. Thus, these suggestions need further development and specificity.

Institutional support was also an essential component of effective online education in reviewed studies. It included advisory supports, additional training for students and staff, orientation programs, technical support systems, and infrastructure to support students who are most vulnerable to dropping out. Some studies suggested online academic advisors and extra tutors as advisory reinforcement (e.g. Castles 2004; Clay et al. 2009; Pierrakeas et al. 2004). Clay et al. (2009) reported improved retention rates as a result of advisement and orientation. In addition to the direct support for students, staff training for faculty and supporting staff was recommended to increase their understanding of students and the particular nature and challenges of students' environment in online education (Castles 2004; Müller 2008). Furthermore, computer training and orientation sessions for students were recommended to equip students with sufficient computer skills and the necessary understanding of online course procedures and requirements (Dupin-Bryant, 2004; Holder 2007). Other suggestions included a technical support program (Castles 2004; Ivankova and Stick 2007) and an administrative system to identify at-risk students and provide

necessary supports, such as counseling or supplementary assistance/training (Dupin-Bryant 2004; Holder 2007; Müller 2008; Perry et al. 2008; Pierrakeas et al. 2004). Supporting students and educating staff involved in online education would improve students' persistence and their academic performance in online courses. As has been the case with other strategy categories, although suggestions for developing or improving institutional support systems were proposed, their effectiveness was not supported by empirical evidence. Since it requires considerable resources to establish an institutional support system, these suggestions need to be tested and assessed before they are applied.

### *Handling environmental issues and emotional challenges*

Because instructors or institutions cannot control a student's environment, suggestions in this section offered three ways to assist students in overcoming their environmental challenges: identifying a student's challenges, preparing staff to address these challenges of students, and providing adequate supportive services to students. Castles (2004) and Perry et al. (2008) suggested identifying students' possible challenges and their needs early on in the course period using surveys or assessment questionnaires. Advisor training and counseling services were also suggested to identify students' personal issues, such as emotional, health, and social problems, and support students to overcome them (Castles 2004; Müller 2008; Perry et al. 2008). However, the approaches to handling students' environmental crises and emotional challenges were limited; moreover, because they effect students indirectly, such problems would be hard to evaluate.

## **Discussion**

### Implications for practice and recommendations for future research

We identified important predictors of student dropout in online courses by thoroughly reviewing empirical studies on online dropout for the past 10 years. The most distinctive dropout factors in online courses were student entry characteristics including students' previous academic and professional experiences and performance, learning skills, and psychological attributes. In addition, course design and institutional supports influenced students' dropout decisions. While students could manage these challenges, environmental supports played significant roles in affecting positively or negatively their dropout decision. As Kember's model (1995) explained, supportive environments and encouragement are necessary for students to achieve social integration in which they are able to successfully embrace study with their work, family and social commitments.

In responding to three major dropout factors, three primary strategies were suggested in order to enhance dropout in online courses: identifying students' challenges and potential, developing high-quality courses, and providing advice and supportive service to relieve students' emotional and personal difficulties.

### *Issues relevant to dropout factors*

Based on our analyses of previous studies of online course dropouts, we now discuss issues with regard to dropout factors and strategies for improving persistence. We then offer recommendations for future research on these subjects. The first concern is relevant to the

relationship among different factors. These factors are not independent but influence each other. Indeed, no single factor can cause a student to withdraw from an online course. Instead, as some researchers acknowledge, it is the interaction of numerous factors that eventually lead to a student to complete or not complete a course (Holder 2007; Morgan and Tam 1999; Perry et al. 2008). However, few studies have actually examined the interrelationship among diverse dropout factors. We found the study by Shin and Kim (1999) unique in that it investigated the relationship among variables rather than simply noting that they were interrelated. For instance, a path analysis revealed that while a learner's job load had no direct significant effect on his or her GPA, it affected GPA indirectly because it limited study time. Shin and Kim thus concluded that adult distance learners in the same courses with similar workplace demands could end up with different grades, depending on their time management skills or whether their living and work environments allowed them to manage their own study time. However, because the previous researchers failed to validate the relationships among dropout factors, we could not draw a comprehensive model describing the indirect and direct influence of those factors on students' dropout decisions. Instead, we were left with many questions. For example, how would a *Student* factor such as psychological attributes—including motivation, self-efficacy, or satisfaction—interact with a particular *Course/Program* factor? Do *Environmental* factors, such as study environments, influence students' degree of motivation? In this context, future studies are needed to examine the degree of interaction and the directions of impact among factors, to help us better understand the dynamics of students' decision to drop out of online courses.

According to the relative frequency with which the factors in the past studies were mentioned (see Fig. 3), we noticed that the three categories of dropout factors are not proportionate; *Student* factors accounted for 55% of the total number of dropout factors that we analyzed, but *Environmental* factors accounted for only 25% and *Course/Program* factors accounted for an even smaller percentage, only 20%. In other words, the bulk of studies on online dropouts view the student characteristics contributing to dropout from a narrow perspective by considering them as a totally separate category. Since human behaviors are influenced by the environments in which humans are situated, student characteristics cannot be independent from other factors. Therefore, researchers should give more attention to the *Course/Program* and *Environmental* factors contributing to student withdrawal from online courses. For example, future studies could investigate the relationship between student retention in online courses and the nature of these courses (field of study, purpose of the course, the level of course—graduate or undergraduate), or the type of the institution offering these courses (i.e., an open university—a distance learning university that aims to deliver education to students who are not physically “on site” as in a traditional campus, and that typically holds no entry requirements, or a conventional university). Finnegan et al. (2009) are exceptional for examining the behaviors of students who enrolled in different types of online courses—English and Communications (EC), Social Sciences (SC), and Science, Technology and Math (STEM). They found the relative levels of student engagement varied by course and field; Successful students in STEM courses spent more time viewing content pages than engaging in discussions with other students. The opposite was true, however, for successful students in SC and EC courses, spent more time participating in discussions, either reading, responding to other students' questions, or posting their own than viewing content pages. This result implied that the most effective course design, which promoted successful student behaviors, might vary depending on the contents and objectives of the online courses.

*Issues relevant to strategies for overcoming dropout factors*

Next, we address issues related to the strategies for overcoming dropout factors. We identified an interesting pattern in our review of 35 studies: although online course dropout factors largely resulted from *Student* factors, the suggested strategies to reduce dropout rates were concentrated on *Course/Program* factors. Indeed, the previous studies suggested only a limited number of strategies for addressing *Student* or *Environmental* factors. Furthermore, we were unable to find any strategies that addressed students' lack of relevant experiences with regard to *Student* factors or increased work commitment regarding *Environmental* factors leading to their decisions to drop out (see Table 3). There is a need to learn more about these dropout factors.

This discrepancy between dropout factors and strategies to overcome dropout factors may be due to the fact that, while institutions can influence *Course/Program* dropout factors (factors for which the most strategies were offered), their ability to influence *Student* dropout factors and *Environmental* dropout factors is negligible. Furthermore, since most distance learning universities employ an "open entry policy" (sometimes called "open admission" or "open enrollment")—a type of unselective and non-competitive admissions process without entry requirements, the students enrolled in online courses tend to vary widely in their previous academic achievements, prior experiences, and relevant skills, thus, making difficult for instructors to accommodate them all. However, compared to *Student* dropout factors and *Environmental* dropout factors, most *Course/Program* dropout factors are relatively easy to manage.

Another point regarding the suggested strategies to overcome online dropouts in the previous studies is that there was rarely any adequate empirical evidence of their effectiveness (11% of reviewed studies). There is therefore a need for further intervention research of specific strategies to solve the dropout problem to prove that they are effective. It is also important to examine the mechanisms and potential drawbacks of each strategy. For example, Clay et al. (2009) are exceptional for evaluating the improvement in retention rates of online courses due to the implementation of targeted advisement and orientation. They conducted a survey to analyze reasons why students withdraw from the online courses and realized that the majority of dropout students did not read the comprehensive information about the online courses prior to registering for them, therefore, they often began the course with misconceptions, such as the belief that online courses would be less difficulty than a face-to-face course and may require little reading. They also were often unaware that, though flexible, online courses demand time-management skills and self-discipline. Based on the findings of the survey analysis, Clay et al. (2009) adopted a policy of requiring students to consult with an eCore advisor prior to enrolling. As part of the advisement for the online courses, students were attempting an online course for the first time or who had previously completed an online course but earned a grade of C or below were directed to take a 10 min online orientation and a short review quiz in order to be able to register for an online course. Moreover, the voluminous packet of information that had previously been sent to students at the beginning semester of each semester were replaced with repeated, shorter emails and personal phone calls focused on a single topic, such as midterm reminders that were spread across the semester. The results of these strategies to overcome the dropout factors demonstrated notable improvements in the retention rates.



## References

### \*These references make up the 35 past empirical studies that we reviewed

- Allen, I. E., & Seaman, J. (2008). *Staying the course: Online education in the United States*. Needham, MA: Sloan Consortium.
- \*Bocchi, J., Eastman, J. K., & Swift, C. O. (2004). Retaining the online learner: Profile of students in an online MBA program and implications for teaching them. *Journal of Education for Business*, 79(4), 245–253.
- \*Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education*, 46, 39–42.
- \*Castles, J. (2004). Persistence and the adult learner: Factors affecting persistence in Open University students. *Active Learning in Higher Education*, 5(2), 166–179.
- \*Cheung, L. L. W., & Kan, A. C. N. (2002). Evaluation of factors related to student performance in a distance-learning business communication course. *Journal of Education for Business*, 77(5), 257.
- \*Chyung, S. Y. (2001). Systematic and systemic approaches to reducing attrition rates in online higher education. *American Journal of Distance Education*, 15(3), 36–49.
- \*Clay, M. N., Rowland, S., & Packard, A. (2009). Improving undergraduate online retention through gated advisement and redundant communication. *Journal of College Student Retention: Research, Theory and Practice*, 10(1), 93–102.
- Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Upper Saddle River, New Jersey: Pearson Prentice Hall.
- Diaz, D. P. (2002). Online drop rate revisited. *The technology source*, May/June. Retrieved from <http://technologysource.org/issue/2002-05/>.
- \*Drouin, M. A. (2008). The relationship between students' perceived sense of community and satisfaction, achievement, and retention in an online course. *Quarterly Review of Distance Education*, 9(3), 267–284.
- \*Dupin-Bryant, P. (2004). Pre-entry variables related to retention in online distance education. *American Journal of Distance Education*, 18(4), 199–206.
- Finnegan, C., Morris, L. V., & Lee, K. (2009). Differences by course discipline on student behavior, persistence, and achievement in online courses of undergraduate general education. *Journal of College Student Retention: Research, Theory and Practice*, 10(1), 39–54.
- \*Frydenberg, J. (2007). Persistence in university continuing education online classes. *International Review of Research in Open and Distance Learning*, 8(3), 1–15.
- Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *The Internet and Higher Education*, 3(1–2), 41–61.
- \*Holder, B. (2007). An investigation of hope, academics, environment, and motivation as predictors of persistence in higher education online programs. *Internet and Higher Education*, 10(4), 245–260.
- Greene, J. C., & Caracelli, V. J. (1997). Defining and describing the paradigm issue in mixed-method evaluation. In J. C. Greene & V. J. Caracelli (Eds.), *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms* (pp. 5–17). San Francisco, CA: Jossey-Bass.
- \*Ivankova, N. V., & Stick, S. L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study. *Research in Higher Education*, 48(1), 93–135.
- Kember, D. (1995). *Open learning courses for adults: A model of student progress*. Englewood Cliffs, NJ: Educational Technology Publications.
- \*Kemp, W. C. (2002). Persistence of adult learners in distance education. *American Journal of Distance Education*, 16(2), 65.
- \*Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers and Education*, 48(2), 185–204.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, GA: Sage Publications.
- \*Liu, S. Y., Gomez, J., & Cherng-Jyh, Y. (2009). Community college online course retention and final grade: Predictability of social presence. *Journal of Interactive Online Learning*, 8(2), 165–182.
- \*Moore, K., Bartkovich, J., Fetzner, M., & Ison, S. (2003). Success in cyberspace: Student retention in online courses. *Journal of Applied Research in the Community College*, 10(2), 12.
- Moore, M., & Kearsley, G. (1996). *Distance education: A system view*. Belmont, CA: Wadsworth.
- \*Morgan, C. K., & Tam, M. (1999). Unravelling the complexities of distance education student attrition. *Distance Education*, 20(1), 96–108.
- \*Morris, L. V., Finnegan, C., & Wu, S. (2005a). Tracking student behavior, persistence, and achievement in online courses. *The Internet and Higher Education*, 8(3), 221–231.

- \*Morris, L. V., Wu, S., & Finnegan, C. L. (2005b). Predicting retention in online general education courses. *American Journal of Distance Education*, 19(1), 23–36.
- \*Muilenburg, L. Y., & Berge, Z. L. (2001). Barriers to distance education: A factor analytic study. *The American Journal of Distance Education*, 11(2), 39–54.
- \*Müller, T. (2008). Persistence of women in online degree-completion programs. *International Review of Research in Open and Distance Learning*, 9(2), 1–18.
- \*Osborn, V. (2001). Identifying at-risk students in videoconferencing and web-based distance education. *American Journal of Distance Education*, 15(1), 41–54.
- \*Packham, G., Jones, P., Miller, C., & Thomas, B. (2004). E-learning and retention: Key factors influencing student withdrawal. *Education Training*, 46(6/7), 335–342.
- \*Parker, A. (1999). A study of variables that predict dropout from distance education. *International Journal of Educational Technology*, 1(2), 1–10.
- \*Parker, A. (2003). Identifying predictors of academic persistence in distance education. *United States Distance Learning Association Journal*, 17(1), 55–61.
- \*Perry, B., Boman, J., Care, W. D., Edwards, M., & Park, C. (2008). Why do students withdraw from online graduate nursing and health studies education? *Journal of Educators Online*, 5(1), 1–17.
- \*Pierrakeas, C., Xenos, M., Panagiotakopoulos, C., & Vergidis, D. (2004). A comparative study of dropout rates and causes for two different distance education courses. *International Review of Research in Open and Distance Learning*, 5(2), 1–13.
- \*Pigliapoco, E., & Bogliolo, A. (2008). The effects of psychological sense of community in online and face-to-face academic courses. *International Journal of Emerging Technologies in Learning*, 3 (4), 60–69.
- \*Poellhuber, B., Chomienne, M., & Karsenti, T. (2008). The effect of peer collaboration and collaborative learning on self-efficacy and persistence in a learner-paced continuous intake model. *Journal of Distance Education*, 22(3), 41–62.
- \*Rolfe, C. J. (2007). Getting the bugs out of the distance learning experience. *College Quarterly*, 10(3), 1–35.
- Rotter, J. B. (1966). *Generalized expectancies for internal versus external control of reinforcement*. Washington, DC: American Psychological Association.
- \*Rovai, A. P., & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and Higher Education*, 8(2), 97–110.
- \*Shin, N., & Kim, J. (1999). An exploration of learner progress and drop-out in Korea National Open University. *Distance Education*, 20(1), 81–95.
- \*Tello, S. F. (2007). An analysis of student persistence in online education. *International Journal of Information and Communication Technology Education*, 3(3), 47–62.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89–125.
- \*Willging, P. A., & Johnson, S. D. (2004). Factors that influence students' decision to dropout of online courses. *Journal of Asynchronous Learning Networks*, 8(4), 105–118.
- \*Woodley, A., De Lange, P., & Tanewski, G. (2001). Student progress in distance education: Kember's model re-visited. *Open Learning*, 16(2), 113–131.
- \*Xenos, M., Pierrakeas, C., & Pintelas, P. (2002). A survey on student dropout rates and dropout causes concerning the students in the Course of Informatics of the Hellenic Open University. *Computers and Education*, 39(4), 361.

**Youngju Lee** is a doctoral candidate in Instructional Technology program at the University of Virginia and to be awarded PhD in December, 2010.

**Jaeho Choi** is a doctoral candidate in Instructional Technology program at the University of Virginia and to be awarded PhD in December, 2010.

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