Online instruction is a form of distance education delivered over the Internet. Studies have shown that online instruction offers a major breakthrough in teaching and learning since it facilitates the exchange of information and expertise while providing opportunities for all types of learners in distant or disadvantaged locations. (2, pp. 6)

This brief literature review takes a look at previous research studies in distance/online education to identify and define the important variables related to enhanced retention and increased success of remote learning.

Many of the research studies on distance education have been conducted on college and university students. Therefore, some of the findings may not apply to high school students.

**Attrition**

Attrition rates in undergraduate distance education courses are 10 – 20% higher than face-to-face courses. One study found that the number one issue why students dropped out of their distance education courses was time management; students either tried to accomplish too much in one semester or they had difficulty in managing their time. Other issues include course assignments being too difficult, directions for assignments were unclear, and students could not get help when they needed it. (1, pp. 5)

Other studies often cite personal reasons such as family problems, finances, child care, distractions, and job needs and demands as the cause of withdrawal. Other reasons include the course being harder than the student originally thought, or the student does not have the technology background. Some students reported confusion, anxiety, and frustration due to perceived lack of prompt or clear feedback from the instructor and from ambiguous instructions on the course website and in e-mail messages from the instructor. Some student also reported that they experience the feeling of isolation. (1, pp. 5)

A recent study at the University of Tennessee found that those who dropped their online courses gave three predominant reasons: a) personal time management, b) unclear written directions for completing coursework, and c) difficult course assignments. (13, pp. 813)
Generally, the research literature provides four major strategies that may be used to decrease attrition in distance education courses. These strategies include: student integration and engagement, learner-centered approaches, learning communities and accessibility to online student services.

Both in the US and UK, there appears to be a clear relationship between a student’s educational qualifications and their subsequent retention. If increasing participation means that a larger number of students are admitted to higher education with lower educational qualifications, then that is likely to lead to an increase in attrition. (5, pp. 361)

The strategy to reduce attrition at the Open University UK is to identify students vulnerable to dropout, followed by early, continuous and intensive proactive interventions with those students. Early identification of vulnerability is carried out statistically from characteristics known at registration stage such as age, sex, previous educational qualification and occupation. (5, pp. 363)

Other factors related to student attrition include: wrong course choice and greater perceived workload on a course. Analysis of the pattern of student withdrawal from courses had shown clearly that if a student does not submit their first assignment, then they are very unlikely to complete the course. (5, pp. 364)

In general, the Open University UK is moving away from forms of support that students have to choose to opt into, as this results in allocating scarce resources only for the most motivated and strategic students. Instead the University is moving toward targeted support for all those identified as at-risk or likely to benefit, in a proactive way that does not rely on student initiative. (5, pp. 370)

**Technology and learning**

Adolescents, now more than ever before, have access to information on a scale unlike any other in history, and learning is taking place beyond the confines of the classroom.

Several studies indicate that the Internet and information technology is becoming pervasive among young people. For example, several US national studies give some indication of how teens access the Internet and through what types of devices. One study reported that 20% of media consumption occurs on mobile devices and that 30% of teens own a personal laptop and thus are able to access the Internet from a private location. Other studies show that social networking seems to be the most prominent with 25% of recreational computer time spent on social networking, and 75% of respondents reported engaging in instant messaging. An additional 80% of adolescents reported playing games online and 89% reported using the Internet to explore their hobbies or interests. Finally, 78% of adolescents reported using the computer and Internet for academic purposes. (7, pp. 33)
However, student perceptions and approaches to using computers and technology for school and for their own interests appear to differ significantly. In one small study, the use of computers and the Internet as an academic resource was reported by the participants as their least favourite activity. Overwhelmingly participants reported being uninterested and frustrated with the specificity often involved with completing homework assignments online.

Not only did participants unanimously report academic computer use as their least favourite activity, but there was a sharp contrast between both strategy use and expectation between participant’s use of the Internet for self-directed informal learning, and the use of the Internet as an academic resource. The most striking contrast was between planning and goal setting for intrinsically motivated and academic computer use. Participants reported planning their time online and setting conscious and explicit goals more often when they were using the Internet as an academic resource.

It may be that students are applying the same closed set of strategies to the Internet as an academic resource that they use with textbooks – for quick resources to answer specific problems, often associated with homework questions, worksheets, or exams. Participants set much less explicit goals when engaged in intrinsically driven activity online. The implication for this is that by setting explicit goals, academic activities online have a set end-point and are thought of as isolated, high specified activities. In contrast, intrinsically driven activities have less clear end points and encourage further and continued exploration. (7, pp. 40-41)

Despite significant shifts in technology, a pedagogical shift from instructor-centered to learner-centered learning has been slow. A traditional text- or instructor-centered paradigm for teaching and learning is still dominant in many e-learning programs. Learners enrolling in online and blended courses are expecting more inquiry-based activities and learner-centered approaches than in the past. (14, pp. 1)

The learner is the most important element of the online learning environment. The more an instructor understands online learners, the better the experience the instructor can create for his or her students. Many online learners are non-traditional students who have a commitment to education. Moreover, they tend to be independent self-starters and highly motivated to learn. (12, pp. 802)

There are some important skills online learners should have in order to have a successful online learning experience:

- Basic computer skills
- Access to a computer and Internet connection
- Time management skills
• Ability to work both independently and collaboratively
• Self-discipline to complete assignments by deadlines rather than waiting until the end of the course
• Motivation to read, write and participate in class activities
• Flexibility to deal with technology issues
• Ability to ask questions to clarify issues in the course. (12, pp. 802)

Another study found that the key to successful online learning for adolescent students lies with motivation and highly structured courses. Additionally, the results of this research indicate that adolescent students are ready to learn in cyberspace if they are able to commit to their education and if the appropriate support and guidance is available to them, especially from their teachers. (2, pp. 9)

Results of studies of distance learning courses indicate that interactive qualities appear to be the major factor in determining course quality as reflected in student performance, grades and course satisfaction. Students perform better in online courses due to the flexibility and responsiveness experienced in online learning. Students’ satisfaction also appears to be positively impacted when (a) the technology is transparent and functions both reliably and conveniently; (b) the course is specifically designed to support learner-centered instructional strategies; and (c) the instructor’s role is that of a facilitator and coach. (2, pp. 10)

Online learning systems make it difficult to control participation of the students. The instructor must have a way of checking that each student is actively participating. Students taking online courses are subject to many opportunities for distraction. These may come in the guises of work, family or social commitment. The Internet itself can be a huge distraction to students. The ability to toggle between open programs means that one could have a study program open yet be playing a computer game, viewing other websites, listening to music and so forth. Instructors have to preempt by either issuing periodic reminders about the need to focus on studies or have policies that prohibit students from such practices when taking a course. (2, pp. 16)

If instructors rely too heavily on multiple choice/true/false/ or other “click the answer” responses, this may not be sufficient to judge students’ depth of knowledge and their ability to respond in length. Teaching and learning has to be a two-way interaction. Some students may view the assessment process as being highly impersonal if all scoring / grading is done by the computer. It is important for the instructor to review results and to provide personal feedback on an individual basis. (2, pp. 16)
Learner-centered psychological principles

Learner-centered course design has been identified as one strategy in increasing student success in distance / online learning.

Learner-centered pedagogy asks what students need to learn, what their learning preferences are, and what is meaningful to them, not just what is considered basic knowledge in a given discipline or what teachers want to teach. In this regard, web-based instruction provides a unique opportunity for learning materials, tasks, and activities to fit individual learning systems and preferences. Networks of learning information are available to stimulate student interests and activities. (14, pp. 4)

In the early 1990s, the American Psychological Association announced a set of 14 learner-centered psychological principles. These principles were derived by an APA Presidential task force that reviewed previous research on learning and instruction, motivation, and development. These principles are as follows.

Cognitive and metacognitive factors:

- *Nature of the learning process.* The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

- *Goals of the learning process.* The successful learner, over time and with support and instructional guidance, can create meaningful, coherent representations of knowledge.

- *Construction of knowledge.* The successful learner can link new information with existing knowledge in meaningful ways.

- *Strategic thinking.* The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals.

- *Thinking about thinking.* Higher order strategies for selecting and monitoring mental operations facilitate creative and critical thinking.

- *Context of learning.* Learning is influenced by environmental factors, including culture, technology, and instructional practices.

Motivational and affective factors:

- *Motivational and emotional influences on learning.* What and how much is learned is influenced by the learner’s motivation. Motivation to learn, in turn, is influenced by the individual’s emotional states.

- *Intrinsic motivation to learn.* The learner’s creativity, higher-order thinking, and natural curiosity all contribute to motivation to learn. Intrinsic motivation is
stimulated by tasks of optimal novelty and difficulty, relevant to personal interests, and providing for personal choice and control.

- **Effects of motivation on effort.** Acquisition of complex knowledge and skills requires extended learner effort and guided practice. Without the learner’s motivation to learn, the willingness to exert this effort is unlikely without coercion.

Developmental and social factors:

- **Developmental influences on learning.** As individuals develop, there are different opportunities and constraints for learning. Learning is most effective when differential development within and across physical, intellectual, emotional and social domains is taken into account.

- **Social influences on learning.** Learning is influenced by social interactions, interpersonal relations, and communication with others.

Individual differences:

- **Individual differences in learning.** Learners have different strategies, approaches, and capabilities of learning that are a function of prior experience and heredity.

- **Learning and diversity.** Learning is most effective when differences in learners’ linguistic, cultural, and social background are taken into account.

- **Standards and assessment.** Setting appropriately high and challenging standards and assessing the learner as well as learning progress, including diagnostic, process and outcome assessment, are integral parts of the learning process.

(Learner-Centered Psychological Principles, APA, as described in 14, pp. 3).

**Motivation and engagement**

As indicated by the various research studies described above, without motivation little learning will take place. Dennen and Bonk (4, pp. 66-71) suggest ten different ways to motivate online learners.

1. **Tone and climate.** The tone or climate of an online class is set at the beginning. These opening moments have the potential to engage and interest learners so that they want to be active participants, or alternatively isolate them and provide little motivation to participate. Much like in the physical world, if a student visits an online location and finds little reason to go back, feels uncomfortable in that place, or is uncertain of its purpose, the student is not likely to participate actively.
2. **Feedback.** Feedback motivates online learners by letting them know how well their performance meets course expectations. Frequent feedback helps students gauge their own performance and motivates them to either maintain or improve the quality of their work. Feedback can take several forms: self-assessments, reading reactions and teacher feedback.

3. **Engagement.** Motivated learners are engaged learners. Interactive activities are particularly engaging and should be incorporated into the courses. (See more on engagement below).

4. **Meaningfulness.** People want to participate in activities that they deem meaningful, authentic and relevant. Online activities that are meaningful to students often involve real-world scenarios and allow learners to discuss or present their own opinions and experiences relative to these scenarios.

5. **Choice.** Giving learners choices allows them to be active participants and feel in control of some aspects of their learning environment. Where possible, students should be given choices as to the sequences of activities and topics / assignments to complete. This allows the student to meet the course requirements while still matching their goals and interests.

6. **Variety.** Repeating the same set of online tasks for each course activity or module will be boring for learners. Learners enjoy variety in online courses – knowing that there is something new for them to master keeps them alert and attentive as well as interested.

7. **Curiosity.** Learner curiosity should be cultivated in an online course, including allowing them to explore ideas beyond those expressed by the instructor.

8. **Tension.** Points of tension are points of discussion. If everyone agreed, then there would be little to discuss. The term “tension” often has negative connotations, but it can be used to generate fruitful learning discussions, debates and assignments.

9. **Peer interaction.** Peer interaction helps engage students with each other. Discussion forums, group projects and collaborative problems solving are techniques that can be used. Students in online classes are motivated by measures of how they are performing not only compared to the instructor’s expectations, but also as compared to classmates.

10. **Goal driven.** Student motivation to participate in online class activities tends to be goal driven. If the goals as presented and valued within the course structure and assessments focus on test performance, students are motivated to study for the test. Group problem-solving activities are a great way to avoid isolation often found in online courses.
Student engagement is considered to be important in effective learning. Engagement is concerned with all the qualities of an experience that really pull people in – whether this is a sense of immersion that one feels when reading a good book, or a challenge one feels when playing a good game, or the fascinating unfolding of a radio drama. (15, pp. 41)

According to one theory (15, pp. 42), the more the following elements are present, the more enjoyable, engaging and immersive an active is:

- A challenge that requires skills with an attainable goal and known rules
- Complete absorption in the activity
- Clear goals
- Immediate feedback
- Concentration on the task on hand
- A sense of control, lacking the sense of worry about losing control
- Loss of self-consciousness
- Transformation of time.

**Self-regulation**

Some studies (10, pp. 1) suggest that academic failures are often related to students’ self-regulation. One model has identified six dimensions of behaviours that affect students’ self-regulation:

- Motivation
- Methods of learning
- Use of time
- Control of one’s physical environment
- Control of one’s social environment
- Performance.

In his study of students’ self-regulation and its impact on distance education, Sun (10, pp. 2) found the following:

- Distance education learners lack instructors’ direct encouragement that is found in the traditional classroom, and thus students may be less motivated to engage in class activities.
- Distance education has the potential to assist learners in self-regulating themselves with online tools such as role-playing and multimedia. However, these might just hold students’ situational interests and the interests may be lost after the temporary motivations are removed.
- Social cognitive processes play important roles in self-regulation. Online activities such as forums, debates, and brainstorming that focus on interaction can potentially facilitate online learners’ social cognitive effects.
• Instructors’ periodically checking on online learners’ progress helps students to self-regulate themselves and encourages them to use their time more efficiently.

**Information-age mindset**

The term *information-age mindset* was coined by Jason Frand (8, pp. 278) and refers to individuals growing up in a “globally connected, service- and information-intense, digitally based culture.” He noted that student attitudes and behaviours evolved over time to something different from earlier generations. After working with students for several years, Frand concluded that the following ten attributes characterize an information-age mindset:

- Computers are not technology
- Internet is better than television
- Reality is no longer real
- Doing rather than knowing
- Nintendo over logic
- Multitasking is a way of life
- Typing rather than handwriting
- Staying connected
- Zero tolerance for delays
- Roles of consumer and creators are blurring.

Other authors have referred to this emerging youth population as millennial generation, digital natives or the net generation. (8, pp. 279)

The research in the area of online learning identifies a number of student values and behaviours related to learning in a digital environment. In summary, these learners:

- Are independent and innovative
- Do not see computers as technology
- Connect constantly with others via multiple digital communication tools
- Demand immediate access to large amounts of information
- Bypass process
- Favor doing, rather than knowing facts and theories. (8, pp. 285)

The process of meeting the demand of a digital learning environment begins when a student recognizes the limitations of old behaviours. Psychological distortions are produced by inherited or socially conditioned responses that no longer produce positive results. For example, how does a student highlight passages in a virtual textbook; or flag references online with post-it notes. These strategies do not work in a digital world. Students begin to re-examine the new learning environment and make adjustments in their behaviour. Students may find that creating an electronic file to save important information works
better. Students identify and capitalize on solutions that technology may offer for learning and embrace the results. (8, pp. 287)

Valuing technology for learning, however, is only the first step in the adoption of, and success with, online education. Students must see the fruits of their efforts. To develop and sustain newly valued and effective strategies for learning online, the student must experience the positive outcome of passing the course, or at least observe other individuals succeeding. Reinforcement and repetition, as with continued student success in online courses, establishes a pattern of activities which may become automatic behaviours, as well as, habits. In the digital world of online learning, students encounter a number of new emotions, derived from changing values and behaviour related to the digital environment. Students become empowered and motivated as they effectively cope with newly evolved emotions and needs related to successful completion of new tasks. (8, pp. 287)

Participating in a digital environment may cause students to lose the motivation to learn that they initially possessed. In years past, learning was driven by lifelong habits cultivated in classrooms dominated by teachers. It is no surprise that some students experience confusion and failure when they begin to participate in the online learning environment. Ever-present, self-paced and self-directed learning results in minimal interaction. Feelings of isolation occur. Students must effectively deal with these emotions if they are to succeed in the new online learning system.

The study by Madrigal and Schreiber (8, pp. 301) on information-age mindset made some new discoveries and confirmed previous research. Their study confirms that student characteristics related to online learning are not necessarily age specific; rather they are dependent upon an individual’s time spent with computers, and experiences while online. However, there are some generational differences, e.g., adults learners take longer to become comfortable with keyboarding, and prefer to write by hand rather than type when learning online.

This research did confirm that an information-age mindset does exist. As important, this study shows that possessing an information-age mindset does NOT automatically translate into success in online courses. Some information-age mindset attributes, in fact, interfere with the process. For example, believing there is little difference between consumer and creator of information creates a profile of being less likely to succeed in an online course.

The stronger the information-age mindset of the individual, the stronger the behaviour is to use Nintendo-style strategies to solve problems. Unfortunately, it is this very behaviour that hinders traditional college-age students’ success in online courses. It appears that the unrestrained, open-ended, trial-and-error discovery strategy, as represented by the Nintendo-style approach, fosters continued online behaviours of random surf, search and
discards of information, instills need of immediacy, and prevents student participation in the
process of learning. (8, pp. 302)

The significant information-age mindset attributes identified in this study as emotional
needs include: the need to stay connected, and zero tolerance for delay. Madrigal and
Schreiber found no significant relationship between these attributes and success in online
courses. This finding appears to partially support other research that suggests students with
strong emotional intelligence – possessing an internal locus of control and high self-
efficacy – are more likely to succeed in online courses than students with low emotional
intelligence – characterized by an external locus of control (i.e., needing constant approval,
and possessing traits of rigidity and impatience). (8, pp. 303)

**Effectiveness of interactive learning**

There are seven aspects that should be examined when determining the effectiveness of
interactive or game-based learning. (15, pp. 107)

- **Learner performance** – whether the learning has taken place and to what extent there
  is an improvement in learner performance.

- **Motivation** – the levels of student motivation, interest and participation in the
  learning activity.

- **Perceptions** – the views of the students towards areas such as the experience of time
  passing, the realism of the activity, amounts of complexity, support received and
  levels of proficiency within the activity.

- **Attitudes** – feelings of the learners and teachers towards the subject itself and the use
  of games for learning within that subject.

- **Collaboration** – the regularity and effectiveness of collaboration.

- **Preferences** – inclinations of the learners and teachers towards different learning
  styles or modes or interaction.

- **Learning environment** – factors associated with the interactive activity itself, such as
  the design of the environment, usability, levels of social presence and the way the
  activity is deployed
Learning management systems

Many educational institutions are finding learning management systems useful and valuable. However, these management systems and tools, by themselves do not guarantee quality learning. They do not foster student reflection, metacognition, interdisciplinary learning, collaborative knowledge building, or higher-order thinking. Additionally, students often display frustration and dissatisfaction with their online courses due to lack of interactions, engagement and communication. As a result, many online learners are simply being warehoused on the web instead of engaging in rich case experiences and interactive simulations as has been promised by e-learning vendors. It is as though online learning tool designers have forgotten to consider learner and instructor needs. (14, pp. 5)

Many institutions currently use course management systems as a delivery mechanism for the subject matter. The integrated features and functionalities, such as the capabilities to present the learning material content in multimedia mode are often underutilized. As a result, this approach does not encourage students’ initiative for managing their own learning process. (11, pp. 66)

It is common for educators to present their online content as text. This traditional working method does not promote student interactivity, engagement with the content, or learning. On the contrary, it gradually reduces the interests of students and leads them to confusion and frustration. (11, pp. 66)
References


