Against the Clock: Speed Training in Library and Information Science Education

Lynne Bowker

We may not always like the speed of today's world, but we still need to prepare students for working in a fast-paced environment. In the library and information science (LIS) professions today, deadlines are becoming ever shorter, yet research into the effects of time pressure in LIS is scarce. This pilot project aims to develop and test a speed-training program to improve LIS students' ability to work under time pressure. An experiment is conducted where students in the control group receive no speed training while students in the experimental group complete speed-training exercises. Students provide feedback through surveys and a focus group. The results suggest that speed training can help students learn to work more quickly and that students feel positively about speed training. Therefore, it may be worth including explicit speed-training exercises in LIS programs.

Keywords: LIS education, LIS pedagogy, professional skills, speed training, time management

> *"I look at the clock that is oh-so-helpfully always displayed with our chats—you'll see the time noted throughout our session to give you an understanding of the pressure I feel seeing it tick away—and realize I have been away way too long from the patron."* (Sosulski, 2016)

There is no question that library and information science (LIS) professionals must work quickly. Yet it seems that the main way in which they are expected to develop this ability is simply by putting in time: As they gain more experience, they are able to work faster. But is trial by fire in the workplace the only way to acquire this skill? Or can it be deliberately cultivated and explicitly honed as part of LIS education, where the stakes are lower and the pressure is less intense? This article presents a pilot study that investigates whether systematic speed training can help LIS students learn to work quickly. By exposing students to time-pressure tasks regularly, but in a relatively low-threat environment, we hope to bring them closer to a point where they can approach a time-sensitive task with confidence rather than panic.

KEY POINTS:

- LIS education programs would benefit from integrating speed training into their courses to allow students to learn to work more quickly under pressure while still in a low-stakes environment.
- At the end of the speed training, students in the experimental group outperformed those in the control group with regard to both task completion and quality when working in a short time frame.
- Students in the experimental group expressed appreciation for the speed training, noting that it helped to boost their confidence when working under time pressure.

This article has eight main sections. Following the introduction, I briefly review literature that addresses the need for speed in LIS, as well as relevant work on speed training in translator education. Next I explain how the pilot study participants were selected, describe the speed training tasks

that were developed, and introduce the data-collection methods that were employed. Finally, I present and discuss the results of the experiment before offering some concluding remarks.

Literature review

At the turn of the twentieth century, it was already clear that information professionals needed to be able to work efficiently and that LIS education programs held some responsibility for helping students to acquire this skill. For instance, as Mudge (1902, p. 334) explained,

> The purpose of the courses in elementary and advanced reference work . . . is to familiarize students with the general aims and methods of reference work, to give them a working knowledge of the principal reference books, to develop the power of research and the ability to follow a clue quickly from book to book for more difficult questions, to cultivate rapid thought and quick answers for simpler questions and to test and increase general information.

But how has this situation evolved over time? If anything, it appears that technological advances have made speed an increasingly important skill. In cases such as virtual or chat reference, there is no denying that time is of the essence, and this "need for speed" phenomenon has been observed by various LIS practitioners. For instance, in presenting the results of a survey designed to evaluate a virtual reference service, Hill, Madarash-Hill, and Bich (2003) reported that among the survey's 37 respondents, one of the most frequent suggestions for improving the service was to have faster responses to questions. Indeed, since the turn of the twenty-first century, this general feeling of needing to work quickly has been echoed by LIS professionals on a regular basis:

- "Both phones and ICQ [i.e., instant messaging] are more demanding than e-mail. They tend to put pressure on you to respond *right now*." (Brandt, 2000, p. 64)
- "On chat, you can only *type* things and you just know someone is on the other side, also sitting there and staring and waiting for an answer, which not only should be completely correct, it should be there *right now*!" (Broughton, 2001, p. 26)
- "IM [instant messaging] patrons do present some unique demands, particularly their desire for quick (almost instantaneous) answers." (Schmidt & Stephens, 2005, p. 35)
- "Chat reference can move very fast, and can make reference providers feel that they have to find answers much more quickly than they would at a physical reference desk." (Kinney, 2010, p. 16)
- "Patrons usually choose chat because it's perceived as being a faster method . . . . The downside of that need for speed is that patrons want their information with the speed of Google, and librarians are real flesh-and-blood people." (Knoer, 2011, p. 47)
- "Evaluation and assessment are also important components of a successful virtual reference service. . . . Success of transactions is often difficult to measure; factors include not only the accuracy of the answer, but the speed of response." (Thomsett-Scott, 2013, p. 6)

Beyond the LIS community, the popular media are increasingly reporting on a growing expectation among employers that new graduates in all fields should arrive

in the workforce with well-developed transferable or "soft skills," including time management skills and an ability to work efficiently. However, a regular theme in this reporting is that universities are not doing enough to prepare students in this regard (e.g., Drummond, Finnie, & Weingarten, 2015; Mancuso, 2014; Millar, 2014; White, 2015).

For their part, students appear to agree with employers that more could be done to prepare them for working efficiently. The Canadian University Survey Consortium (2015) surveyed over 18,000 graduating students at 36 Canadian universities. As part of the *2015 Graduating Student Survey*, respondents were presented with a list of 29 employability skills, such as writing clearly and correctly, the ability to find and use information, computer literacy, speaking to an audience, collaborative interaction in groups, and time management skills. Respondents were asked to rank the three most important skills that they thought their university should be helping them to develop as part of their formal education. Thinking logically and analytically was ranked first overall, followed by time management skills. However, when asked how much their university education actually helped them to develop their time management skills, only 24% of respondents indicated "very much" (pp. 23–24).

Returning to the specific case of LIS students, if we consult the American Library Association's *Core Competencies of Librarianship* (ALA, 2009), the *Professional Competencies for Reference and User Services Librarians* developed by the ALA's Reference and User Services Association (RUSA, 2003), and the Canadian Association of Research Libraries' *Core Competencies for 21st-century CARL Librarians* (CARL, 2010), we can observe that none of these specifically identify the capacity to work quickly as a core competency. However, Saunders (2012, p. 399), who conducted a survey that aimed to identify core reference competencies from an employers' perspective, notes that "they seem to be highlighting the necessity for librarians to understand and be able to use different formats and types of resources efficiently."

Are today's LIS programs preparing students to meet the "need for speed" expectation? While there have been numerous acknowledgments in the LIS education literature that the curriculum must keep up with the times, systematic speed training does not seem to have found a place. For instance, Thomsett-Scott (2012) describes efforts to create a formal program for training LIS students for reference services, but it does not include specific speed training. Meanwhile, Todorinova and Torrence (2014) survey recent case studies and best practices for implementing and assessing reference training programs in academic libraries, but none of the examples explored includes any explicit speed training. Similarly, O'Connor's (2011) extensive survey of the syllabi of reference courses in 45 different ALA-accredited programs, which contains a detailed discussion of the teaching and evaluation methods used, does not mention any type of speed training. Indeed, Savolainen (2006) and Crescenzi, Capra, and Aguello (2013) point to a dearth of LIS research that investigates temporal factors.

Moreover, while reference services present an obvious case where there is a need for speed, it is likely that other types of LIS professionals must be able to work quickly too, based on the aforementioned observations that employers in all disciplines expect graduates

to be efficient. This suggests that speed training in LIS education has the potential to be beneficial, not only in reference courses but also beyond (e.g., in subject analysis, cataloging and resource description, abstracting, and indexing).

The present project was inspired by recent success in introducing speed training in a translator education program (Bowker, 2016; Bowker & McBride, 2017). Like LIS professionals, translators must often work against the clock. Yet, as in the situation described above for LIS students, translation students do not typically receive formalized speed training as part of their education. Instead, they are expected to acquire this skill in a high-pressure and high-stakes situation once they are actually in the workforce and facing tight deadlines. Bowker (2016) and Bowker and McBride (2017) explain that they were motivated to explore speed training to find a way to help students learn to consciously develop the habit of working more quickly rather than simply throwing them in at the deep end after graduation.

Bowker (2016) reports on an experiment conducted with final-year undergraduates in a technical translation course. In brief, the students spent the first part of each class attempting to translate a text in a short timeframe. Over the semester, they developed strategies, acquired techniques, and gained confidence, and by the end, they were less intimidated by deadlines and better able to turn out quality work in a short timeframe. Students were positive about the experience and the results, and they indicated that they wished they had had earlier opportunities to learn how to work more quickly.

While Bowker (2016) focused specifically on translation, Bowker and McBride (2017) devised a type of speed training that could be used earlier in the program, while students were still learning to translate. This second speed exercise focused on abstracting, and students had a short deadline to read and summarize a text. The text and abstract were both in the same language, so it was suitable for students who were not yet competent translators. Yet, as described by Bowker and McBride, the speed abstracting exercise nonetheless promoted a number of transferable skills that are useful for translators, as well as for many other types of professionals, including LIS professionals: the ability to analyze and grasp meaning quickly, the ability to extract key ideas and structure from a text, the ability to organize ideas, the ability to convey ideas concisely and accurately, and the ability to recognize and avoid distortion in information transfer.

These speed-training successes with translation students motivated us to adapt speed training for an LIS program, where students also need to learn to work quickly. As was the case for translation, it seems likely that speed training can be introduced in a variety of ways in an LIS program and not simply in a single course (e.g., reference). By giving LIS students a number of opportunities to cultivate an ability to work quickly, and by using speed-training exercises that reinforce other elements of LIS education, we may be able to better prepare LIS students for the competitive twenty-first-century marketplace. The following sections describe a pilot project that was undertaken to put these ideas to the test.

Participants

In their experiments, Bowker (2016) and Bowker and McBride (2017) did not use control groups, which limited the observations they could make. For the LIS speed-training study,

we included both experimental and control groups so that we could compare their results.[1] The following sections describe the participant profiles.

Experimental group

The experimental group participants consisted of all seven students who enrolled in the elective course *Concept Analysis and Representation* during the spring 2019 semester. All participants had prior experience using the University of Ottawa's learning management system (Brightspace). All seven students who began the course completed it successfully, and all participated in all of the speed-training exercises. This group was selected for four main reasons, as explained below.

First, this initial investigation into the feasibility of LIS speed training was conceived as a pilot study. Because the approach was experimental, we wanted to try it on a small scale before determining whether it could be scaled up in future. Therefore, we identified a course with a relatively low enrollment.

Second, we wanted to experiment with LIS speed training in a non-reference course. As noted in the literature survey, the link between speed and reference is obvious, so some implicit speed training may already take place in reference courses. To determine whether speed training can be relevant to and effectively integrated into other aspects of LIS education, it was necessary to experiment in a non-reference course.

Third, we chose a course that we were scheduled to teach so that we could design meaningful speed-training activities that were directly related to the course. Bowker and McBride (2017) advise that speed training should not detract from a course's learning objectives; they recommend that speed-training exercises should allow students to learn to work quickly while still reinforcing key competences. By building speed training into a course, rather than offering it as an extracurricular activity, we could design activities that were integrated into student learning in a purposeful way to explicitly support course learning objectives.

Fourth, the course *Concept Analysis and Representation* is an advanced course on the University of Ottawa Master of Information Studies (MIS) program, meaning that students must have completed a minimum of four of the six required foundation courses on the 15-course MIS program. According to Bowker (2016), speed training seems more successful with advanced students, rather than beginners, since the former group have already acquired base skills and can therefore shift some of their focus to learning to work more quickly. However, the students in Bowker's (2016) experiment also stated that they would have liked the opportunity to begin speed training before their final semester. Therefore, introducing speed training somewhere in the middle of the MIS program would seem to be preferable.

Control group

Control-group participants were other students in the MIS program who were recruited via posters, word of mouth, social media, and emails to the student association. Prospective control-group participants were informed that if they met the eligibility criteria and

successfully completed all the required activities, they would receive a $75 Amazon gift card. To qualify for the control group, participants had to meet the following criteria:

- be registered in the MIS program;
- have completed at least four foundational courses, including *Knowledge Organization*[2];
- have used the Brightspace learning management system;
- be available to participate in a 90-minute introductory session;
- be willing to complete two 30-minute online exercises approximately five weeks apart;
- be available to participate in a 45-minute end-of-project focus group.

The first ten qualified candidates who applied were accepted. Although we needed only seven control-group participants to match the number of experimental group participants, we recruited ten in case some dropped out. This proved to be prudent, as one control-group participant completed the initial exercise but not the end-of-project exercise, while another experienced repeated technical difficulties during the second exercise, which made the results unusable. Therefore, the partial data collected from these two participants were excluded.

Rather than participating in speed training as part of a course, the control group participated in an extracurricular format and received a modest compensation. However, the control group participants were required to come to the first class for a joint introductory session and to the last class for a joint focus-group session.

Comparison of experimental and control-group profiles

In comparing the profiles of the participants in the experimental and control groups, as illustrated in Table 1, we can see that they were similar, though not identical. All participants in both groups had successfully completed a minimum of four foundational courses, including *Knowledge Organization*, meaning that no participant was an absolute beginner in the field of LIS. Moreover, most participants in both groups were more than halfway through the MIS program. Nevertheless, while the profiles of the participants in both groups were similar, we can observe that, as whole, the participants in the control group had slightly more experience in the program than those in the experimental group.

Table 1: A comparison of the profiles of participants in the experimental and control groups according to number of MIS courses completed

	Experimental group	Control group
# students who had completed 10 courses	2	3
# students who had completed 8 courses	3	3
# students who had completed 5 courses	1	2
# students who had completed 4 courses	1	0
Total # of students	7	8

Speed-training exercises

As noted previously, Bowker and McBride (2017) identified five areas of skill that are needed by many professionals and that can be practiced with a view to cultivating the habit of working more quickly: the ability to analyze and grasp meaning quickly; the ability to extract key ideas and structure from a text; the ability to organize ideas; the ability to convey ideas concisely and accurately; and the ability to recognize and avoid distortion in information transfer. Therefore, we developed the speed-training exercises with these criteria in mind.

Owing to the experimental nature of the speed training, as well as Bowker's (2016) recommendation that speed training should be a low-stakes activity (at least initially), we decided not to grade the speed-training exercises but to use them as activities that would reinforce some of the course learning objectives. Moreover, mindful of Bowker and McBride's (2017) observation that students grow bored repeating the same activity weekly, we designed three types of speed-training exercises that could reinforce the following three learning objectives for the course *Concept Analysis and Representation*:

- understand and explain the notions underlying concept analysis and representation and the interrelationships between these notions and the broader information environment within which they operate;
- create abstracts that can act as surrogates for a variety of texts;
- identify appropriate indexing terms for a variety of texts.

With these learning objectives in mind, we first designed a cloze test exercise, which would allow students to reinforce theoretical knowledge acquired during the course. Next, we designed two additional speed-training exercises that focused on abstracting and indexing, two skills that students should develop during the course. By presenting students with three different types of relevant speed-training exercises on a rotating basis, we hoped to avoid the problem of boredom while also allowing each type of exercise to be repeated multiple times to permit practice and reinforcement. We must also point out that, while we tried to make all the exercises of a comparable level of difficulty, it was challenging to find texts of exactly the same length or difficulty level. Similarly, given that different students may have developed expertise in different areas, some students may have found some tasks easier than others. This must therefore be recognized as a limitation of the methodology. Details about each type of task are found below.

Cloze tests

Essentially, in a cloze test, students are presented with a text in which certain passages have been blanked out. The students must supply the words or phrases that have been omitted, thereby demonstrating their knowledge and comprehension of the text. While cloze tests are commonly used in a language-learning context, researchers such as Kleijn, Pander Maat, and Sanders (2019), among others, have demonstrated that cloze testing can be useful for assessing text comprehension more broadly. For the speed-training exercise, we modified the traditional cloze test by providing multiple choice answers from which the students could make a selection to fill in the blanks.

Each speed-training cloze test consisted of an extract of approximately 500 words taken from an article that students had already been assigned to read for the *Concept Analysis and Representation* course. In each text, five passages were blanked out, and students were presented with multiple choice options from which they could select the correct passage to fill in the blanks. In this way, the cloze test speed training exercises were designed to reinforce knowledge that was being acquired elsewhere in the course.

For the first and last speed-training exercises, which were carried out by members of both the experimental group (who were taking the *Concept Analysis and Representation* course) and the control group (who were not taking the course), the text extracts were taken from "Chapter 9: Subject Analysis" in the book *The Organization of Information* (Joudrey & Taylor, 2018), which is used for the foundation course *Knowledge Organization* that all members of both the control and experimental groups had previously taken.

In total, five cloze test exercises were created: one for the baseline test, three for the speed-training exercises, and one for the end-of-project exercise.

Abstracting exercises

The abstracting exercises were intended to allow students to practice text summarization, a skill that they needed to develop as one of the learning objectives of the course *Concept Analysis and Representation*. We wanted the speed-training exercises to be authentic, but we also wanted to be realistic about what could be accomplished in ten minutes or less, since we did not want the speed training to take up a disproportionate amount of time during the course. If the task was too challenging, students could become discouraged and not benefit from the exercise; however, we still wanted to reinforce knowledge acquisition that was relevant to the course. Therefore, the texts were taken from professional magazines rather than academic journals, including *American Libraries* (ALA's magazine) and *The Open Shelf* (the online publication of the Ontario Library Association). The articles selected addressed issues relevant to the *Concept Analysis and Representation* course. Extracts of approximately 500 words were selected and students were asked to summarize these in roughly 150 words.

In total, five abstracting exercises were created: one for the baseline test, three for the speed-training exercises, and one for the end-of-project exercise.

Indexing exercises

For the indexing exercises, once again we sought a balance between allowing students to practice in a largely authentic way and creating exercises that could be reasonably accomplished in a short time frame. Therefore, for a single indexing task, we asked students to read three 250-word abstracts and to provide three indexing terms for each abstract. The abstracts came from EBSCO's Library, Information Science and Technology Abstracts (LISTA) database and were identified using search terms such as "subject analysis," "controlled vocabulary," and "taxonomy." In this way, students doing the indexing exercises would also be reinforcing their knowledge on topics being taught in the *Concept Analysis and Representation* course.

In total, five indexing exercises were created: one for the baseline test, three for the speed-training exercises, and one for the end-of-project exercise.

Data-collection methods

The *Concept Analysis and Representation* course took place during the spring 2019 semester. The class was scheduled two evenings per week for three hours at a time over six weeks (i.e., a total of 12 three-hour classes). All data were collected during this six-week period. The details of the different data-collection methods and types of data collected are described below.

Introductory session and initial survey

Members of the control group were invited to join the experimental group members in the second half of the first class so that everyone could participate in the same 90-minute introductory session.

We first gave a general overview of the notion of speed training, and then all students completed a four-question, anonymous, online survey developed using Survey Monkey. Students were asked to identify whether they belonged to the experimental or control group, but no other identifying details were collected. The goal of the first survey was to uncover students' initial perceptions about the need for working quickly and the potential of speed training to help them cultivate this skill. Students were also asked to indicate whether they had ever previously participated in any type of speed training, and if so, to describe what type and whether they found it to be helpful.

Next, three invited guests–an academic librarian, a public librarian, and a government information specialist–were asked to share their own thoughts and experiences about how the need for speed manifested itself in their workplaces, as well as the consequences of not being able to work quickly. All students had the opportunity to probe more deeply into the need for speed in the workplace. The idea behind inviting practicing information professionals to speak with the students was to emphasize the relevance of speed training to LIS careers through the sharing of authentic experiences.

Following the guest-speaker contributions, we introduced the students to the three types of exercises that would comprise the speed-training activities: abstracting, indexing, and cloze testing. We walked the students through an example of each type of activity, reviewed the instructions, and showed the students how to access the exercises on the Brightspace learning management system.

Control-group data collection

The next step was to gather baseline data. Two days after the introductory session, members of the control group were asked to spend a total of 30 minutes completing three tasks (ten minutes per task): one abstracting exercise, where students summarized a 500-word text in 150 words; one indexing exercise, where students read three 250-word abstracts and proposed three indexing terms for each; and one cloze test, where students read a 500-word text in which five passages had been blanked out and then selected multiple choice answers to fill in the blanks. These tasks were completed online through Brightspace, which allows for time limits to be imposed.

Five-and-a-half weeks later, the control-group participants completed a second set of three tasks that was similar in nature to the first set (i.e., abstract, indexing terms, cloze test). However, the time allocated for each task was reduced to five minutes.

Experimental-group data collection

Baseline and end-of-project data

To provide baseline data, the experimental group completed the very same initial three-part exercise (i.e., abstract, indexing terms, cloze test) that the control group had completed, using the same texts and with the same 10-minute deadline for each task. This exercise was carried out via Brightspace as homework between the first and second classes.

At the beginning of the second-last class, the students in the experimental group carried out the very same set of three tasks that the control group participants had carried out for their end-of-project tasks. The experimental group used the same texts that had been used by the control group, and they had the same five-minutes-per-task time limit.

Speed training

In the nine classes between the collection of the baseline data and the collection of the end-of-project data, students in the experimental group completed one speed-training task at the beginning of each class. The first time the task was abstracting, the next time it was indexing, and the next time it was a cloze test, and then the series repeated until the students had completed a total of nine speed-training tasks (three of each type). Each class, the time allocated for the task was reduced by 30 seconds. Therefore, while the time limit for performing each task during the baseline data collection had been 10 minutes, the time allowed for the first speed-training task was 9 minutes and 30 seconds, and for the second task it was 9 minutes, and so on, until the ninth and final speed-training task, which had a time limit of 5 minutes and 30 seconds.

Students received feedback on their speed-training exercises, but these exercises were not graded. Moreover, data from the speed-training exercises were not included in the project results per se; rather, only data from the baseline exercise and the end-of-project exercise were collected and analyzed.

Mid-point and end-of-project surveys

After the fifth speed-training task, experimental group members completed a short anonymous online survey delivered via Survey Monkey (four questions). This survey aimed to uncover students' perceptions about whether they thought the speed training was helping them to learn to work more quickly, whether/how they were changing the way in which they worked because of the time pressure, and whether they thought the speed training was valuable. The experimental-group participants completed this very same survey again after the end-of-project speed-training exercise.

Wrap-up session focus group

The control group joined the experimental group for the final hour of the last class of the course, which occurred six weeks after the introductory session. This time was used for a focus group where participants from both the experimental and control groups could share their thoughts and experiences, ask questions, or make suggestions about LIS speed training. The focus group session lasted approximately 45 minutes (a 15-minute presentation

of the results followed by 30 minutes for discussion). Although the session was recorded, technical issues resulted in poor sound quality, so it was not possible to produce a detailed transcript. However, both the researcher and a research assistant took notes during the session.

Results

Initial surveys

The initial survey was completed by the control group as well as the experimental group. Students were first asked whether they thought it would be important to be able to work quickly in a professional LIS context; all respondents either agreed or strongly agreed with this statement.

To the question about whether they had any previous experience with formal speed training, all respondents replied "No." However, several shared examples from their previous experience where they had been expected to work quickly (e.g., a student who had formerly worked as a professional musician recounted that they frequently had short deadlines to learn new pieces of music). In all cases, however, the respondents who had prior experience of needing to work quickly indicated that this skill had been acquired on the job, rather than as part of their preparatory training. Moreover, most recounted that learning this skill on the job had been stressful and sometimes costly (e.g., working extra unpaid hours to practice, making errors).

Finally, students were asked whether they thought that formal speed training exercises in an LIS program could help students to improve their speed. Three respondents (20%) ventured that speed training could help students to improve their speed considerably, nine (60%) predicted moderate improvement, two (13%) expected a slight improvement, and one (7%) anticipated that speed training exercises would not help.

Baseline data

The baseline data consisted of the results of the identical initial set of tasks (i.e., abstracting, indexing, and cloze test) that were completed by both the experimental and control groups. Recall that students in both groups had 10 minutes to complete each of the three tasks. The baseline data were evaluated and compared in two ways.

First, as illustrated in Table 2, we noted whether each task was complete. A complete task meant that the student had finished the work required (i.e., prepared an abstract of 150 words, provided three indexing terms for three abstracts, and filled in all blanks on the cloze test) within the 10-minute time limit allowed for each task. As can be seen, all students in both groups finished the cloze test; however, not all students managed to finish the abstracting or indexing tasks. Overall, the students in the control group performed better than the students in the experimental group with regard to task completion for the baseline tasks, with a slightly higher average completion rate (+3%) for the indexing task, and a considerably higher average completion rate (+20%) for the abstracting task.

Table 2: Number of students in the experimental and control groups who completed the baseline tasks

Group	Student	Abstracting task complete	Indexing task complete	Cloze test task complete
Experimental group	EG-1	Yes	Yes	Yes
	EG-2	Yes	Yes	Yes
	EG-3	No	Yes	Yes
	EG-4	No	No	Yes
	EG-5	Yes	Yes	Yes
	EG-6	No	Yes	Yes
	EG-7	No	No	Yes
Total complete		3 (43%)	5 (72%)	7 (100%)
Control group	CG-1	No	No	Yes
	CG-2	Yes	Yes	Yes
	CG-3	Yes	Yes	Yes
	CG-4	Yes	Yes	Yes
	CG-5	Yes	Yes	Yes
	CG-6	Yes	Yes	Yes
	CG-7	No	Yes	Yes
	CG-8	No	No	Yes
Total complete		5 (63%)	6 (75%)	8 (100%)

In addition to determining whether the students in both the experimental and control groups had completed the tasks, we also considered how well they had performed the tasks, since it would be easy to race through a task and "complete" it by simply typing or selecting anything. The results of the multiple-choice cloze test were evaluated automatically using the Brightspace quiz feature. To evaluate the quality of the abstracts and of the indexing terms, we assigned a score out of 5, where 0 represents a wholly unacceptable product and 5 represents an outstanding product. We recognize that such evaluation can be subjective, and that ideally, having multiple evaluators and determining an inter-rater reliability score would increase the validity of the findings. However, since the project had limited funding, and since the modest goal of the pilot study was to see whether speed training in LIS showed any promise, we felt it reasonable to proceed with a single set of scores assigned by the researcher/professor of the course. As a reminder, scores were shared with the students for information purposes, but they were not used to calculate official grades. Table 3 summarizes the quality scores of the initial set of baseline tasks carried out by students in

Table 3: Quality scores (on a scale of 0 to 5) received by students in the experimental and control groups for the baseline tasks

Group	Student	Abstracting task quality score	Indexing task quality score	Cloze test task quality score
Experimental group	EG-1	3	4	5
	EG-2	3	5	5
	EG-3	Incomplete	3	4
	EG-4	Incomplete	Incomplete	5
	EG-5	4	4	4
	EG-6	Incomplete	4	3
	EG-7	Incomplete	Incomplete	5
Average score for complete tasks		3.33 / 5 (66%)	4 / 5 (80%)	4.45 / 5 (89%)
Control group	CG-1	Incomplete	Incomplete	4
	CG-2	3	3	3
	CG-3	4	4	5
	CG-4	3	4	4
	CG-5	3	3	4
	CG-6	4	4	5
	CG-7	Incomplete	4	5
	CG-8	Incomplete	Incomplete	4
Average score for complete tasks		3.4 / 5 (68%)	3.65 / 5 (73%)	4.25 / 5 (85%)

both groups; scores were not assigned to incomplete tasks. The results show that although experimental-group students scored slightly higher on average for the quality of two of the three tasks, the scores for the two groups were relatively close overall, with a difference of less than 5% between the two on the abstracting and cloze-test tasks, and a difference of 7% for the indexing task.

End-of-project data

At the course end, both groups again completed a common set of tasks. For the control group, this was the only set of tasks that they had performed since the baseline tasks six weeks earlier. Meanwhile, the experimental group had completed nine speed-training exercises (three of each type) with a gradually shortened time limit during that same six-week period. Both groups had just five minutes to complete each end-of-project task. Once again, these tasks were evaluated for completeness (see Table 4) and quality (see Table 5).

Table 4: Number of students in the experimental and control groups who completed the set of end-of-project tasks

Group	Student	Abstracting task complete	Indexing task complete	Cloze test task complete
Experimental group	EG-1	Yes	Yes	Yes
	EG-2	Yes	Yes	Yes
	EG-3	Yes	Yes	Yes
	EG-4	No	Yes	Yes
	EG-5	Yes	Yes	Yes
	EG-6	Yes	Yes	Yes
	EG-7	Yes	Yes	Yes
Total complete		6 (86%)	7 (100%)	7 (100%)
Control group	CG-1	No	No	Yes
	CG-2	Yes	Yes	Yes
	CG-3	No	No	Yes
	CG-4	No	Yes	Yes
	CG-5	Yes	No	Yes
	CG-6	No	Yes	Yes
	CG-7	No	Yes	Yes
	CG-8	No	No	No
Total complete		2 (25%)	4 (50%)	7 (88%)

Regarding task completion on the tighter timeframe, the experimental group improved their completion rates in both abstracting and indexing, and they maintained the same perfect score for the cloze test. In the entire group, just one student did not manage to complete the abstracting task, and all other tasks were completed. In contrast, the control group members appear to have struggled when faced with the shorter timeframe, lowering their completion rates for all three tasks (abstracting, indexing, and cloze test) by 38, 25, and 12 percentage points, respectively.

As for quality, the data in Table 5 reveal that although the time limit was halved, the experimental group as a whole managed to increase their average scores slightly in two of the three categories (abstracting and cloze test), while dipping slightly from 80% to 77% for the indexing task. In contrast, the control group as a whole saw a drop of 5 percentage points or more in their average scores across all categories and also performed more poorly than the experimental group in all categories. Once again, incomplete tasks were not evaluated for quality.

Table 5: Quality scores (on a scale of 0 to 5) received by students in the experimental and control groups for the end-of-project tasks

Group	Student	Abstracting task quality score	Indexing task quality score	Cloze test task quality score
Experimental group	EG-1	4	4	5
	EG-2	4	4	5
	EG-3	3	4	5
	EG-4	Incomplete	3	4
	EG-5	4	4	5
	EG-6	3	4	5
	EG-7	3	4	4
Average score for complete tasks		3.5 / 5 (70%)	3.85 / 5 (77%)	4.7 / 5 (94%)
Control group	CG-1	Incomplete	Incomplete	4
	CG-2	3	4	5
	CG-3	Incomplete	Incomplete	3
	CG-4	Incomplete	3	4
	CG-5	3	Incomplete	4
	CG-6	Incomplete	3	4
	CG-7	Incomplete	3	4
	CG-8	Incomplete	Incomplete	Incomplete
Average score for complete tasks		3 / 5 (60%)	3.25 / 5 (65%)	4 / 5 (80%)

Mid-point and end-of-project surveys

Only the experimental group completed the mid-point and end-of-project surveys, where respondents were asked whether they perceived that the speed training received was helping them to work more quickly. At the experiment's mid-point, one respondent (14%) felt that speed training was helping considerably, while five respondents (72%) felt it was helping moderately, and just one (14%) felt it was helping slightly. By the project's end, these numbers had shifted such that five respondents (72%) felt the speed training was helping considerably, while two (14%) felt it was helping moderately. No respondents to either survey felt that the speed training had no value.

End-of-project focus group

At the course end, all participants participated in a joint focus group to provide feedback on the speed-training experience. Field notes taken by the researcher and research assistant were analyzed and themes were identified, as summarized in Table 6.

Table 6: Major themes and specific comments raised during the focus-group session

Group	Themes	Comments
Experimental group	• Increased confidence • Reinforcement of other learning activities • Perceived benefit of adopting speed training more widely in the program • "Speed" as a marketable skill • Gamification as a motivator	• All seven students reported being more confident about tackling tasks on a short deadline • Three students reported feeling more prepared to rely on their own judgment rather than having to "verify everything in multiple sources before making a decision" • All students felt that speed training reinforced their other learning, with one student commenting that "I always have good intentions to go back and review key readings instead of reading them just once, but I never seem to find time. The cloze tests gave me this opportunity." • One student commented, "I appreciated the weekly feedback I got on the exercises, and I feel very prepared to assign index terms or prepare summaries now. I would like to do some kind of speed training in some of my other courses so that I could improve other skills too. Most of the time, we just do an exercise once, so if you don't get it the first time, you don't get another chance. Then you don't feel so confident about having to do that task in a job setting." • One student indicated they now consider "speed" as a marketable skill, noting that during a recent job interview, they had shared the speed-training experience with the employer and had emphasized how they felt more ready to work in high-pressure situations. • One student commented, "I actually looked forward to the speed exercises! I tried to keep track of how well I did in the previous weeks and pushed myself to improve. Like trying to beat my high score in a game."
Control group	• Desire to participate in future speed training • Value of expert confirmation	• Seven of the eight students hoped they would be able to participate in speed training in a future course, while the remaining student indicated that they already felt adept at working under pressure. • "After hearing the different information professionals speak about different ways they faced time pressure in their jobs, I wish I could have had the chance to be in the speed training group."

Discussion

Before discussing the results of the experiment, we must point out some limitations of the study. As noted, the investigation consisted of a pilot study in one course with a relatively small number of participants in both the experimental and control groups, with the latter having slightly more experience than the former; this information must be taken into account when attempting to interpret or generalize the findings. In addition, it is important to recognize that experiments designed to investigate speed are notoriously difficult because it is challenging to control all the other variables (Bayer-Hohenwarter, 2009). As noted previously, students arrived with different levels of knowledge and experience, and it was impossible to find texts of precisely the same length and level of difficulty for the speed-training exercises. Moreover, other researchers (e.g., Savolainen, 2006) have noted that time and time constraints are subjectively experienced, and that given the same time constraint, there is variability in the amount of time pressure reported by different individuals. Finally, we must reiterate that owing to technical problems, there is no transcription of the focus group session, although two sets of notes were taken during the session. In spite of these limitations, we believe that useful things can be learned from the pilot project, where the idea was to set up a learning environment requiring students to push themselves beyond their comfort zone to become less intimidated by short deadlines.

Overall, we believe that the project to pilot speed training in an LIS course was a success. Prior to the project, no experimental or control group members had engaged in any formal speed training, and most believed that it would help only moderately, if at all. However, by the mid-point survey, participants in the experimental group perceived that the speed training was beginning to help, and by the end of the project, all experimental group members perceived improvement in their performance. These perceptions were supported by the data collected from both groups at the beginning and end of the project. As a whole, the control group had slightly more experience in the MIS program, and the baseline data indicated that they performed slightly better than the experimental group with regard to task completion. In terms of task quality, the control group's average performance on baseline tasks was lower than that of the experimental group, but only slightly. In contrast, by the project's end, the comparative scores for both task completion and quality show that the experimental group convincingly outperformed the control group on all tasks. This suggests that the speed-training exercises performed between the baseline and end-of-project data collection points had a positive impact on the experimental group students' ability to complete and perform these tasks well under pressure. Of course, as previously noted, it is very difficult to control for all other variables during a speed experiment, and we must recognize that time and time constraints are subjectively experienced (e.g., Savolainen, 2006); therefore, we cannot say with absolute certainty that speed training is the sole reason for the improved performance of the experimental group on the end-of-project tasks. On the other hand, we can say with some certainty that the speed training did not affect their performance negatively.

In hindsight, we believe it would have been worth incorporating one or two additional types of task into the initial and end-of-project task sets, while excluding these additional tasks from the speed training per se. This would have allowed us to observe whether

improvements were noted only for the specific types of task that had been included in the bi-weekly speed training (i.e., abstracting, indexing, cloze test), or whether the improvements could be seen to extend beyond the specific speed training tasks to a more general ability to work quickly on any task. We plan to include this element in future investigations into speed training.

On the subject of tasks, the cloze test appeared to be the easiest type of task for most students to complete both quickly and well, while the abstracting task was the most challenging, and the indexing task fell between those two. This could be explained by the fact that the cloze tests only required students to select from prepared multiple-choice answers, while the abstracting exercises required them to produce a text. Meanwhile, the indexing task required original production, but only of individual terms, not texts. Active production is more cognitively demanding than passively selecting from a set of possible answers. However, the experimental group students confirmed Bowker and McBride's (2017) assertion that having a variety of exercises is preferable to repeating just a single exercise.

Another indirect indicator of the pilot project's success was the enthusiasm of the experimental group at the focus session, coupled with the expressed desire of seven out of eight control group members to participate in future speed training. The focus-group participants commented on the value of hearing from practicing professionals at the introductory session about the need for speed in the workplace. Specifically, experimental-group participants found this to be a motivator for fully engaging with speed training, while control-group participants indicated that it made them regret not being able to participate in the speed training. One experimental group member shared how they now view speed as a marketable skill, explaining that in a recent interview for a work placement, they informed the prospective employer about the speed training and emphasized that they now felt more prepared to work under pressure. The student reported that the employer was intrigued by and appreciative of the idea of speed training as a way to better prepare students for the realities of the workplace.

Another important theme that emerged from the experimental group was the idea that speed training served to increase their confidence in their own abilities. For instance, most students felt more confident that they would be able to work well in a high-pressure situation, while one student remarked that the speed training had helped them to learn to trust their own judgment to a greater degree. The student explained that previously, they used to look up information in multiple sources before committing to an answer; however, the speed training had encouraged them to let go of the need to triple-check every item.

Finally, one experimental group student shared their own positive view of speed training by explaining that they had looked forward to the speed-training exercises because they turned it into a sort of game by keeping track of their past performance and trying to do better on each successive attempt, just as they would if playing a video game. Interestingly, Bowker (2016) also discusses the potential for gamification of speed training; she developed a leaderboard for the students, thus enabling them to engage in a friendly competition with one another. The report from the LIS student would seem to confirm that gamification can be a useful addition to speed training, even if the competition is with oneself.

Concluding remarks

As Savolainen (2006) and Crescenzi et al. (2013) strongly emphasize, time pressure has not been studied extensively in LIS, and much remains to be done in this area. I believe that the pilot study presented here, even with its imperfections, can contribute to a deeper understanding of this under-researched area. Less-than-perfect experiments can still be informative; the key is to recognize their limitations and take these into account when interpreting the findings. The results of this pilot study suggest that speed training appears to be at least moderately effective and can be integrated into courses other than a reference course. When working against a tight deadline, the experimental-group students outperformed those in the control group with regard to both task completion and quality. Moreover, speed training is appreciated by the students. Experimental-group students reported acquiring greater confidence in their ability to work under pressure, which in turn stands to benefit their future employers.

I hope this article has provided food for thought about how learning to work against the clock is a skill for which LIS students can be specifically trained in a low-stakes environment, rather than having to learn this skill on the job when the stakes are higher. Future possibilities for extending this work include developing additional types of speed-training exercises; determining whether the benefits of speed training apply only to the specific types of task included in the speed training or whether the benefits can be seen more widely; scaling up the project to include a larger number of students; integrating speed training more widely across an LIS program; and identifying other groups who could benefit from speed training.

Lynne Bowker, *School of Information Studies, University of Ottawa*, is a full professor at the University of Ottawa, where she holds a cross-appointment between the School of Information Studies and the School of Translation and Interpretation. She is a member of the interdisciplinary Educational Games Group (EGG) and is interested in game-based learning and pedagogy. Email: lynne.bowker@uottawa.ca

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Notes

1. Permission to use the speed-training related data for this publication was sought in accordance with the requirements of the university's Research Ethics Board.
2. We did not ask control-group participants whether they had previously taken the course *Concept Analysis and Representation*; however, in hindsight, it would have been interesting to have this information.