Efficacy of Minimalist Instruction to Develop Self-Regulatory Skills to Search The Web

Ard W. Lazonder

University of Twente, The Netherlands

Web searching hinges on procedural skills to handle a search engine and self-regulatory skills to handle one’s own search behavior. The procedural skills can probably best be taught by minimalist instruction. This study assessed the efficacy of minimalist instruction to develop self-regulatory skills. Two versions of minimalist instruction were compared, one with self-regulatory skills instruction and one from which this instruction was removed. Seventy students from secondary education were randomly assigned to conditions. Results indicated no performance gains of self-regulatory skills instruction. Students in both groups performed equally proficient on a test that assessed search performance on the Web and in an online library catalogue. Explanations are advanced for these findings and topics for further research are identified.

Introduction

Information seeking is becoming the buzzword for this decade. Its popularity was probably incited by the proliferation of Internet and the World Wide Web. A rapidly growing number of people search the Web to obtain information for professional and private purposes. The use of the Web for educational purposes is increasing accordingly. This is aptly illustrated by the increasing number of assignments that require students to collect source materials from the Web. The pervasive use of the Web in schools and at home raise the impression that students are able to search the Web. Yet, this is a false impression since nearly half of the second graders from Dutch secondary education consider themselves incapable of operating Web browsers and search engines (Ten Brummelhuis and Slotman, 2000). A comparative study further showed that these findings are consistent with the situation in many European countries (Pelgrum, 1999).

These studies convey the need to teach students the skills to access and navigate the Web. Although literally hundreds of books, articles and Web sites designed to train users to become skilled Web searchers are available, few of these publications appear to have been tested in the classroom or have been developed from the research on the topic (Carroll, 1999). The present research therefore set out to examine how students can best be supported in gaining Web searching expertise.

Minimalist instruction (Carroll, 1990) may foster the development of procedural skills to operate Web search engines. Minimalism originated from the field of software training in the early 1980s. Its development was prompted by qualitative research studies of people learning to use computer applications. These studies revealed idiosyncratic difficulties people encounter when first trying to use software. The minimalist approach proposed a set of design principles and heuristics to anticipate these problems. In short, these principles aim to minimize the extent to which instructional materials obstruct learning and focus the design on activities that support learner-directed activities. Empirical studies have substantiated the instructional efficacy of these principles in teaching novice users the basics of various computer programs (e.g., Carroll, 1990; Lazonder and Van der Meij, 1993; Ramsay and Oatley, 1992; Van der Meij and Lazonder, 1993). In all of these studies minimalist instruction lead to

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1 Postal address: University of Twente, Department of Instructional Technology, P.O.Box 217, 7500 AE Enschede, The Netherlands. Email: lazonder@edte.utwente.nl

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faster training and better learning as compared to other instructional approaches.

However, Web searching involves more than operating search engines. The Web opens up so much information that designated skills to manage the information-flow are called for. That is, Web users need self-regulatory skills to plan, monitor and evaluate their actions. Since the minimalist approach has predominantly been applied to teach procedural skills, it is unclear how it might be extended to support the development of self-regulatory skills. Nor has it been established whether minimalist instruction in self-regulatory skills enhances search performance. Yet it is important to consider these issues because self-regulatory skills are of greater importance to Web searching than are procedural skills (Jacobson and Ignatii, 1997; Marchionini, 1995).

This paper addresses these issues from a theoretical and practical perspective. Section 2 explores the applicability of minimalism to teaching self-regulatory skills. To this end, the characteristics of the minimalist approach are compared to the conditions for successful self-regulatory skill instruction. The sections that follow report a study that attempted to offer initial evidence regarding the efficacy of minimalism to enhance search performance.

**Instructional conditions for self-regulatory skill learning**

Instructional conditions denote the terms under which the instruction leads to the desired learning outcomes. The present learning outcomes primarily relate to acquiring the self-regulatory skills Web searching entails. The ability to transfer these skills to different information retrieval systems such as online public access catalogues (OPAC) and CD-ROMs is another, probably equally desirable learning outcome.

Three instructional conditions apply to the acquisition of self-regulatory skills. The first is that self-regulatory skills should be taught in context (Boekaerts, 1997; Hattie et al., 1996; Puntambekar and Du Boulay, 1997). Self-regulatory skills are always used within a given task domain. Their spontaneous application in that content area seems to depend on the students’ conditional knowledge about when and where to use particular skills. Without this knowledge, the self-regulatory skills remain inert, and students may fail to invoke them during task performance. The instruction should therefore associate the self-regulatory skills with the circumstances in which they are applicable. This in turn may increase the students’ perceived utility of a self-regulatory skill (Shunk and Ertmer, 2000).

The second instructional condition states that there must be ample opportunity to practice the self-regulatory skills (Garner and Alexander, 1989; Vermunt, 1998; Weinstein et al., 2000). Students not only need to understand that a self-regulatory skill exists or when it should be used, they also need to know how to put it in practice. Self-regulatory skills require significant effort to learn; hence, practice should be extensive. Following from the first instructional condition, the opportunities for practice should be designed around authentic tasks.

The third condition refers to the mechanism of cognitive scaffolding (Boekaerts, 1997; De Jong, 1992; Shunk and Zimmerman, 1997; Vermunt, 1998). As self-regulatory skills require significant effort to learn, students can easily become overwhelmed by the number of regulatory activities they have to perform. Scaffolded instruction aims to avoid this problem by offering students an adaptable and temporary support system during the initial phase of the learning process (Boekaerts, 1997). The amount of external support is inversely proportional to the students’ level of self-regulation. Initially, a fair amount of external support is given. As students become more proficient, the external support is gradually faded.

The literature on self-regulation presents no instructional conditions for transfer. There is, however, reason to believe that instruction that meets the abovementioned conditions will generalize beyond the context in which it is provided. In case of Web searching, transfer concerns the spontaneous use of self-regulatory skills in searching different information retrieval systems such as OPACs and CD-ROMs. This requires near transfer: the self-regulatory skills are performed in almost identical situations that differ from Web searching only with regard to the operation of the search system.

Near transfer is based on rule automation. It occurs spontaneously when skills automatized in one context are triggered in another, highly similar context. There seem to be three guidelines for the design of instruction that aims at rule automation and, consequently, near transfer (Perkins et al., 1990; Salomon and Perkins, 1989; Van Merriënboer and Paas, 1990). The first one implies that extensive, step-by-step practice is required to automatize a skill. By repeated practice, behavior becomes fast, effortless, and unlimited by processing capacities. The second guideline asserts that practice should be divergent, linking the skills to the contexts in which they will be applied. Although automation facilitates evocation of the
elements that are applicable in comparable situations, the instruction should force the skills to adapt to similar contexts, yielding the ability to apply these skills in situations different from the instructional setting.

However, extensive practice on varying, authentic tasks is relatively ineffective. The lack of guidance and modeling during practice seems to impose a high cognitive load. This may cause students to direct their attention to other, nonessential parts of the task; it may even cause them to completely lose track of what they are doing. The instruction should therefore reduce cognitive load and redirect the student’s attention to the relevant aspects of the task. This may be achieved by using completion problems to practice a skill (Van Merriënboer, 1997). Completion problems contain a given state, a goal state, and a part of the solution. During practice, students have to complete the partial solution.

These guidelines match with the instructional conditions for self-regulatory skill learning. Both sets of directives advocate ample opportunities for practice in realistic settings. The use of completion problems can be considered a form of cognitive scaffolding (Van Merriënboer, 1997). Both support mechanisms seek to reduce cognitive load by offering external support. Both mechanisms also entail a gradual decrease of external support when learners acquire more experience. As for completion problems, external support comes in the form of a part of the solution to training tasks. During the initial stages of learning, students have to produce a small part of the incomplete solution. As experience increases, the students’ share in solving the problem increases accordingly.

These similarities lead to the tentative conclusion that instruction designed in compliance with these conditions will foster the acquisition and transfer of self-regulatory skills. The question then becomes whether instruction designed in compliance with the guidelines of the minimalist approach satisfies these conditions. The essence of the minimalist approach is embodied in the principles and heuristics presented in Table 1. The remaining part of this section discusses if and how these minimalist principles comply with the conditions for successful self-regulatory skill instruction. This in turn provides a brief description of the minimalist approach; a comprehensive overview appears in Van der Meij and Carroll (1995).

Minimalist instruction is anchored in the task domain, thus complying with the condition of contextual instruction. This minimalist principle reveals itself especially in the design of practice. Training tasks include genuine activities that represent the core tasks of a domain. Minimalist instruction also advocates ample opportunities for practice. It provides users with an immediate opportunity to engage in meaningful learning activities. Explanations are reduced to the bare minimum and definitions are operational instead of conceptual. That is, they are presented directly before or after the relevant action steps and explain what something ‘does’ rather than what it ‘is’. The gradual decrease of external support (i.e., cognitive scaffolding) pertains to the minimalist principle ‘support reading to do, study and locate’. To support the flexible ways in which people process instructional materials, minimalist instruction capitalizes on the users’ accumulating understanding of the program. Minimalist

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### Table 1

**Characteristics of the minimalist approach and their relationship with the conditions for self-regulatory skills instruction**

<table>
<thead>
<tr>
<th>Minimalist principles and heuristics</th>
<th>Instructional conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Choose a task-oriented approach</td>
<td>Teach self-regulatory skills in context</td>
</tr>
<tr>
<td>- Design instructional activities that are real tasks</td>
<td></td>
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<tr>
<td>- Let components of the instruction reflect the task structure</td>
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<tr>
<td>2. Choose an action-oriented approach</td>
<td>Provide ample opportunities to practice</td>
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<tr>
<td>- Provide an immediate opportunity to act</td>
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<tr>
<td>- Encourage and support exploration and innovation</td>
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<tr>
<td>- Respect the integrity of the user’s activity</td>
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</tr>
<tr>
<td>3. Support reading to do, study and locate</td>
<td>Gradually decrease external support (i.e., cognitive scaffolding, completion problems)</td>
</tr>
<tr>
<td>- Gradually fade out action information</td>
<td></td>
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<tr>
<td>- Omit information that can easily be inferred</td>
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<tr>
<td>- Make chapters brief and self-contained</td>
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<tr>
<td>4. Support error recognition and recovery</td>
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<tr>
<td>- Prevent mistakes whenever possible</td>
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<tr>
<td>- Provide error information when actions are error-prone or when correction is difficult</td>
<td></td>
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<tr>
<td>- Provide error information that supports detection, diagnosis, and correction</td>
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</tr>
<tr>
<td>- Provide on-the-spot error information</td>
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</table>

Adapted from Van der Meij and Carroll (1995)
In addition, the minimalist approach already holds some elements that facilitate self-regulation. Error-information, for example, models problem solving behavior and reduces cognitive load by helping users to detect, diagnose, and correct errors (Osman and Hannafin, 1992). Its presence also invites users to monitor task performance. Action statements like ‘Look on the screen to...’ and ‘Check if the dialog window...opens’ also support monitoring. These prompts replace lengthy explanations in case information can be found on the screen or can easily be inferred.

The length of minimalist instruction may call for some concern, however. Minimalist instruction is typically brief, whereas developing self-regulatory skills requires a considerable amount of practice. Yet, the time on task does not necessarily impede the development of self-regulatory skills. Van der Meij (1999) stressed that minimalist instruction leads to ‘high quality training time’. It reduces training time by 25 to 52%, and at the same time, yields superior task performance. The time learners spent processing minimalist instruction is obviously well spent.

In sum, this section attested that the minimalist approach satisfies the conditions for successful self-regulatory skill instruction. It was therefore concluded that minimalist instruction can support the acquisition and transfer of self-regulatory skills. An experiment was performed to substantiate this theoretical assertion with empirical evidence. Two versions of minimalist instruction were compared: one with self-regulatory skills instruction (MI+) and one from which this instruction was removed (MI-). Students in the MI+ condition were expected to yield better search performance than students in the MI- condition. That is, they were expected to outperform the MI- students on Web search tasks and OPAC search tasks.

Several learner characteristics might affect experimental findings. For example, students with high levels of prior Web-experience might show superior search performance during and after practice compared to students with low levels of Web-experience (e.g. Hill and Hannafin, 1997; Khan and Locatis, 1998; Lazonder et al., 2000). The students’ level of prior self-regulation might have a similar effect on learning activities and learning outcomes. To anticipate these extraneous effects, the study controlled for the students’ level of Web-experience and self-regulation, thus allowing for a valid comparison of instructional strategies. The study did not consider the students’ knowledge of the topics being searched. Hsieh-Yee (1998) asserted that domain expertise becomes a factor only after a certain amount of search experience had been acquired. Research further suggests that domain expertise can be left out of account when teaching a homogeneous group of students to search the Web (Lazonder, 2001).

### Method

#### Participants

Participants were second and third graders from a school for secondary education. There were 42 males and 28 females with a mean age of 14.0 (SD=0.8). Their level of Web-experience ranged from less than 1 hour to over 200 hours. Participants were randomly assigned to conditions. There were 39 participants in the MI+ group and 31 participants in the MI- group.

#### Instructional materials

An introduction manual was designed to familiarize students with the browser and search engine. The manual had a minimalist design and addressed basic procedural skills that were prerequisite to the self-regulatory skill instruction (e.g., entering a URL, following hyperlinks, using task bar buttons). It did not treat the self-regulatory aspects of the search process.

Starting from the idea of parallel processing, the MI+ instruction prompts learners to shift attention from performing procedural skills to execute a search, to performing self-regulatory skills to manage search behavior (cf. Perkins et al., 1990). The MI+ instruction therefore provides self-regulatory skills instruction on the spot, fully integrated with the procedural skills to operate the search engine. The instruction explained the ‘what, how, and why’ of a self-regulatory skill (e.g., Osman and Hannafin, 1992; Shunk and Ertmer, 2000). Due to this integrated presentation, self-regulatory skills instruction was signaled to indicate its distinct nature and to facilitate recognition. Two icons were used for this purpose: a ‘light bulb’ signals the ‘what’ and ‘why’ part, a ‘hand’ indicates the ‘how’ part. Two fading techniques were used to meet the instructional condition of cognitive scaffolding. The first one concerns the specificity of the various information types (i.e., what, how, and why). Similar to De Jong (1992), instructional support is gradually faded from a full description of a self-regulatory skill, through a brief description, to a question that...
prompts learners to perform that skill. The second fading technique addressed the locus of control. In keeping with the minimalist call for genuine learning activities, students always perform practice tasks in full, but their share in performing the self-regulatory parts of a search varied as a function of their prior learning experiences. For instance, on the first search task students merely have to identify the number of hits. The instruction details all other self-regulatory activities, explicitly stating the keyword students should enter, the buttons to they should click, and the Web site they should retrieve. In the course of practice, the responsibility of performing these skills is gradually transferred from the instruction to the learner. An illustrative page of the MI+ instruction is shown in Appendix A.

The MI- condition contained no self-regulatory skill instruction; it merely addressed the procedural skills to operate the search engine. In this respect, the MI- condition was content matched with the MI+ condition. It addressed the same procedural skills, contained the same instructions, and used the same practice tasks. An example is presented in Appendix B.

**Questionnaires and tests**

Two questionnaires were administered to assess the participants’ levels of Web-experience and self-regulation. A background questionnaire determined the participants’ experience in working with the Web. It also gathered some personal data such as age, sex, and ethnic background. The Motivated Strategies for Learning Questionnaire (MSLQ) assessed different facets of self-regulation, including self-efficacy, task value, test anxiety, cognitive strategies, and metacognitive strategies (Pintrich et al., 1991). The MSLQ contained 53 items; each item was judged on a Likert scale that ranged from 1 (not at all true of me) to 7 (very true of me). The scale ‘test anxiety’ was not taken into account due to insufficient reliability ($\alpha=0.68$). Coefficient alphas for the other scales ranged from 0.80 to 0.88.

Two tests were used to assess achievement outcomes. A performance test recorded acquired Web-searching skills. It contained four fact-based Web search tasks that were comparable (but not identical) to the practice tasks. These tasks dealt with general topics such as finding the entrance fee to a museum or the data of a sailing camp. A transfer test assessed search performance with a new search system. It consisted of four fact-driven OPAC search tasks that asked participants to find various books on the painter Paul Gauguin.

**Procedure**

All sessions took place in a computer class equipped with 30 Pentium II computers. Internet Explorer and a Dutch search engine called Ilse (www.ilse.nl) were used to access information on the Web. A registration program was installed on each computer to record the participants’ test performance. It captured the action from screen and saved it as an AVI movie file. The experiment was conducted in nine groups of 16 to 26 students. Each group attended four sessions of 50 minutes each. The time between sessions was one week.

At the beginning of the first session, the participants were informed on the experiment’s goal and received instructions. Next, they filled in the background questionnaire and the MSLQ. During the remaining part of this session, participants worked through the introduction manual. The same manual was used for both conditions. The second and third session involved the self-regulatory skills training. Participants received a manual (MI+ or MI-). The two types of manuals were proportionally divided among the participants in each group. The manuals contained sheets that marked the beginning and end of a session. These sheets also prompted participants to write down the time (as displayed on screen) and to rate the mental effort to grasp the subject matter of that particular session. The tests were administered during the fourth session. After a brief introduction, participants were given 20 minutes to complete each test. A counterbalanced administration was used to anticipate order effects. Participants were encouraged to perform the search tasks in given order, but they were free to relinquish a task. They were not allowed to use their manual or to consult the experimenter during both tests.

**Design and analyses**

The study used a between-subjects design with instructional condition (MI+ and MI-) as the independent variable and the participants’ prior levels of Web-experience and self-regulation as covariates. Web-experience was defined as the time participants’ had worked with the Web. Level of self-regulation was indicated by the mean MSLQ scores.

Dependent variables for the training phase were time and cognitive load. Practice time was the time to complete the self-regulatory skill instruction (i.e., the second and third session), which was computed from the sheets in the training manuals. Cognitive load was indicated by the mental effort participants invested to understand the learning content. Mental effort was measured by a single question (“It took me great effort to understand this lesson”) that was administered after each session.
Participants answered this question on a scale ranging from 1 (totally disagree) to 5 (totally agree).

Dependent variables for the test phase were learning outcomes (i.e., achievement on Web search tasks) and transfer (i.e., achievement on OPAC search tasks). For both measures, the mean number of completed tasks and successfully completed tasks was scored. Given the time constraints in the test session, higher scores on these measures automatically imply faster task performance. Performance efficiency was indicated by the number of successfully completed tasks to the time to complete these tasks.

The effect of instructional condition on these measures was assessed with MANCOVA’s. Univariate analyses followed when a significant multivariate effect was observed. The test statistics for the covariates are reported in case of significance only. Missing data were excluded on an analysis-by-analysis basis.

Results

Table 2 displays the mean learning activity scores. There was no multivariate effect of instructional condition on these measures \((F(2,65)=1.95)\), indicating that participants in both groups needed an equal amount of practice time and experienced as much mental effort during practice. The participants’ level of Web experience tended to affect learning activity scores as a covariate \((F(2,65)=3.03, p<.06)\). A significant univariate effect was found for mental effort \((F(1,66)=6.08, p<.05)\). Unstandardized regression coefficients indicated that higher levels of Web-experience were associated with lower amounts mental effort. Level of Web experience has no effect on practice time \((F(1,66)=1.87)\). The participants’ prior level self-regulation did not affect learning activities.

Table 3 summarizes the scores on the Web search tasks. Instructional condition had no effect on these measures \((F(3,50)=1.12)\). Participants in both conditions completed as many Web search tasks, produced an equal number of correct answers and performed equally efficient. Similar findings were obtained on the OPAC search tasks \((F(3,48)=.14)\), indicating that MI+ and MI- participants performed these tasks equally proficient. The covariates also yielded no effects on achievement outcomes. Search performance on both types of tasks was not affected by the participants’ level of Web-experience and self-regulation.

Discussion

This paper examined whether and how minimalist instruction may support the development of self-regulatory Web searching skills. Theoretical evidence suggests that minimalist instruction may serve this purpose. To validate this presumption, an experiment was performed to assess the effects of minimalist instruction in self-regulatory Web searching skills on learning activities and learning outcomes.

An important finding with regard to practice is that additional self-regulatory skills instruction does not increase training time. Although MI- students completed practice about eight minutes faster, this difference was not statistically significant. The results further suggest that instruction in self-regulatory skills does not increase cognitive load during practice.

Contrary to expectations, self-regulatory skill instruction did not enhance performance on Web search tasks. Students in both groups performed these tasks equally successful and efficient. These findings seem to suggest that MI+ students did not develop the self-regulatory skills—or at least not

| Table 2 |
| Mean learning activity scores (and standard deviations) |
| Training time (min.) | Mental effort |
| MI+ | 38.0 (12.2) | 2.1 (0.9) |
| MI- | 30.1 (11.6) | 1.6 (0.7) |

| Table 3 |
| Mean test scores (and standard deviations) |
| Web search tasks | OPAC search tasks |
| Completed tasks | Successfully completed tasks | Efficiency | Completed tasks | Successfully completed tasks | Efficiency |
| MI+ | 1.9 (0.7) | 1.7 (0.9) | 35.0 (23.1) | 2.4 (0.9) | 1.4 (0.5) | 27.0 (19.9) |
| MI- | 1.7 (0.5) | 1.4 (0.8) | 27.0 (16.1) | 2.3 (0.9) | 1.4 (0.6) | 24.9 (18.6) |
enough to yield superior search performance. However, there may be other reasons why the anticipated effects failed to appear. One is the time constraints in the test session. Students in the MI+ group may have decided not to employ the acquired self-regulatory skills because it would penalize them in the sense that they might complete fewer tasks. A second reason is sensitivity of the test. The Web search tasks measured in a holistic manner what the self-regulatory skill instruction intended to improve: search performance. Although this outcome measure is ecologically valid and has substantial practical value, it may not reflect the actual differences in self-regulatory skills. Attempts to reanalyze the data are currently being performed. It should be noted, however, that this is merely a theoretical issue: practically speaking, the self-regulatory skills instruction did not enhance search performance.

Self-regulatory skills instruction was further expected to enhance transfer. This hypothesis too was not supported by the results. Students in both groups performed equally successful and efficient on OPAC search tasks. One reason for nontransfer is the amount of practice. Transfer may have failed because the instruction was too brief to automatize the self-regulatory skills. This inadequacy can be accommodated by further extending the MI+ instruction. More practice improves the facilities to automatize self-regulatory skills, which in turn, is expected to enhance near transfer. An alternative interpretation is the distance of transfer. Near transfer occurs when students perceive high similarity between the learning tasks and the transfer task. The OPAC search tasks were therefore designed to resemble the Web searching practice tasks as much as possible. Nonetheless the students might have considered searching an OPAC and searching the Web as distinct activities. In that case, the OPAC search tasks would require far transfer. Clearly, the instruction was not designed to support this type of transfer.

To conclude, this study failed to confirm the assumed functionality of minimalist instruction to develop self-regulatory Web searching skills. The concise nature of minimalist instruction is probably the main reason why this is so. Future research should therefore examine whether extending minimalist instruction with repeated step-by-step practice would overcome this problem. Future attempts should also consider using different transfer tasks. Near transfer might, for example, be indicated by the students’ capacity to search the Web with a different search engine. Their ability to search an OPAC would then be considered an instance of far transfer. Comparing students’ search performance on these tasks might shed a decisive light on the functionality of minimalism to develop self-regulatory skills.

Despite the lack of supportive evidence, this study holds important practical implications. Educators aiming for students to become proficient Web searchers should carefully consider course duration. The results of this study suggest that extensive repeated practice is required to develop self-regulatory skills. Paradoxically, students typically resent rehearsing the same skills over and over again, causing them to skip most review exercises (Carroll, 1990). The amount of repeated practice should therefore be well balanced, allowing students to develop a skill without losing interest. Integrating repeated practice in self-regulatory skills throughout the curriculum seems a potentially fruitful alternative, especially since subject teachers increasingly ask students to obtain information from the Web.

References


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Appendix A: Illustrative page of the MI+ instruction

3. Performing a keyword search

Selecting a keyword

1. Click

The search engine Ilse appears on the screen.

SEARCH TASK

For your Dutch language class, you have to interpret a text entitled "Whizkids on the electronic highway". This text was published in Time Magazine. The author, prof. dr. ir. P. Akkermans, frequently uses computer terms like 'black hole', 'URL', 'gateway' en 'digital literacy'. Find the meaning of these terms in a Web dictionary.

Before you start your search, you have to decide which keyword to search for. Take your time: selecting a keyword is an important step in the search process. A carefully selected keyword will return many relevant Websites. A poor choice of keywords will produce few relevant sites.

1. Select the best keyword (Note: you may select only one keyword)

2. Search for that keyword

How many Websites did you find?

Which Websites are potentially relevant?

Is it useful to evaluate more Websites?

Choose your next action. Are you going to start a new search, refine your search, or open a Website?

3. Find the meaning of the computer terms listed in the search task.
3. Performing a keyword search

Selecting a keyword

1. Click

The search engine Ilse appears on the screen.

SEARCH TASK

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1. Select the best keyword *(Note: you may select only one keyword)*

2. Search for that keyword

3. Evaluate the search outcomes

4. Find the meaning of the computer terms listed in the search task.