Liu, C.-C. et al. (eds.) (2014). Proceedings of the 22nd International Conference on Computers in Education. Japan: Asia-Pacific Society for Computers in Education.

Model for Supporting Cognitive and Metacognitive Strategies in Technology Enhanced Language Learning

Katrin SAKS*, Äli LEIJEN
University of Tartu, Estonia
*katrin.saks@ut.ee

Abstract: Good language skills bridge the gaps in global communication. Even though English is being considered the world language, advancing the English proficiency is the primary task in the countries where it is not the mother tongue. The learners' language proficiency has been found to be correlated with their use of language learning strategies (LLS) (Hsiao & Oxford, 2002; Benson, 2011). That is why measuring the learners' use of LLS is considered one of the most widely-spread methods of estimating the efficiency of language studies. The skills and habits of strategy use are very individual and usually develop over many years. However, as shown in several studies (e.g Brunstein & Glaser, 2011; Kondo *et al*, 2012; Nash-Ditzel, 2010) it is possible to support learners' language studies leading them to use more effective learning strategies. The aim of the current study was to conduct a literature review on different interventions that have been used to support using effective learning strategies in the context of technology-enhanced learning and drawing on the results of this review to design a model and concrete assignments to support learners' effective LLS use towards greater language proficiency and self-regulation. The most promising interventions supported both cognitive and metacognitive activities and often utilized the form of prompts. Based on these principles a model was designed for scaffolding language learning assignments in a blended learning environment. Support for learners is provided with prompts that aim to guide learners to more efficient and conscious use of LLSs.

Keywords: language learning strategies, language proficiency, self-regulation, intervention

1. Introduction

The widespread use of learning technologies in different educational settings has generated the growing need for students to self-regulate their learning activities (Bannert & Reimann, 2012), assuring independence and learner autonomy when directing their studies. When in traditional classroom students may stay passive knowledge receivers, learning in technology-enhanced environments presumes learner autonomy, abilities to self-analyze and self-regulate their learning activities. Many studies have identified a significant positive correlation between academic achievement and self-regulated learning ability (Dabbagh & Kitsantas, 2005; Schunk & Zimmerman, 1994) which indicates that good learners typically have good self-regulating learning abilities. However, students rarely demonstrate adequate skills of self-regulation which in turn hinders to achieve satisfactory academic outcomes (Lee *et al*, 2010; Kiewra, 2002). Similar deficit of self-regulated learning skills has been reported in the studies of language learning (Benson, 2011). The learner's use of language learning strategies is considered one way of assessing the efficiency of his language studies (Hsiao & Oxford, 2002) as strategy use is connected with language proficiency and have much potential for enhancing learning, learner autonomy, independence and self-regulation (Wong, 2011).

Self-regulated learning skills are of crucial importance to be academically successful, at the same time they seem to be complicated learning skills to acquire. Therefore, the most efficient ways to support learners' cognitive and metacognitive learning strategies have to be found and instructed. As there is no single understanding of an efficient way of scaffolding self-regulation, the focus of the current study is (1) to find out the most effective supports and conditions for scaffolding self-

regulation reported in empirical studies, and (2) on the basis of them to develop a model with specific assignments to assist self-regulated language learning mechanisms in a blended English language course (English for Specific Purposes). When developing the model we drew on the theoretical frameworks of LLSs by R. Oxford (1990) and self-regulation by P. Pintrich (2000). Subsequently, the theoretical frameworks we proceeded from, will be introduced.

2. Models of learning and learning strategies

Many constructivist learning theories and models emphasize the role that self-regulation plays in the learning process. The theory of strategic learning (Weinstein, 1994) is focused on students as active, self-determined individuals who process information and construct knowledge. The model has placed the learner at its core, and surrounds him with three interactive components that explain successful learning: skill, will, and self-regulation. *Skill* refers to the actions or thinking processes which are related to recognition of key concepts and processes, and how meanings are constructed. *Will* indicates individual learning attitudes, acceptance of new information, will to concentrate and make efforts, and anxiety toward his own learning performance. *Self-regulation* describes the learner's ability to manage his personal learning process, especially how to plan, monitor, focus on and evaluate his own learning. Categorized by the above three components, the learning strategies refer to any *thoughts*, *behaviours*, *beliefs* or *emotions* that facilitate the acquisition, understanding or later transfer of new knowledge and skills (Tsai, 2009). This general framework coincides with the approach to contemporary language learning supporting the principles of communicative language learning and metacognition. In the following subsection, an overview of the most dominating classification of LLSs is given.

2.1 Language learning strategies

Different classifications of language learning strategies have been produced by many researchers (Rubin, 1975; Stern, 1975; O'Malley & Chamot, 1990) that gave their input to the six-strategy taxonomy of Rebecca Oxford, designed in 1990. Strategies are the learner's toolkit for active, conscious, purposeful and attentive learning, and they pave the way towards greater proficiency, learner autonomy and self-regulation (Hsiao & Oxford 2002). According to Oxford, LLSs have the features of contributing to the main goal, allowing learners to become more self-directed, being problem-oriented, including specific actions taken by the learner, involving many aspects of the learner, not just cognitive, supporting learning both directly and indirectly, being not always observable, being conscious, possible to be taught, flexible, and influenced by a variety of factors (1989). The system of LLSs developed by Rebecca Oxford is believed to be more comprehensive and detailed than earlier classification models by her predecessors (Jones, 1998). Oxford divided the LLS into two main categories: direct and indirect ones (Table 1). *Direct strategies* including memory, cognitive and compensation subgroups, directly involve the target language, such as reviewing and practising. *Indirect strategies* - metacognitive, affective and social ones, provide indirect support for language learning, such as planning, cooperating and seeking opportunities.

Table 1: Strategy groups based on R. Oxford (1990).

Direct strategies: directly involve the target language, such as reviewing and practising	**Memory** strategies: aid in entering information into long-term memory and retrieving information when needed for communication	* Creating mental images
		* Applying images and sounds
		* Reviewing well
	Cognitive strategies: used for forming and revising internal mental modes and receiving	* Practising
		* Receiving and sending messages

	and producing messages in the target language	* Analysing and reasoning
		* Creating structure for input and output
	Compensation strategies: needed to overcome any gaps in knowledge of the language	* Guessing intelligently
		* Overcoming limitations in speaking and writing
Indirect strategies: provide indirect support for language learning, such as planning, cooperating and seeking opportunities	**Metacognitive** strategies: help learners exercise executive control in planning, arranging, focusing, and evaluating their own learning process	* Centring your learning
		* Arranging and planning your learning
		* Evaluating your learning
	Affective strategies: enable learners to control feelings, motivation and attitudes related to language learning	* Lowering your anxiety
		* Encouraging yourself
		* Taking your emotional temperature
	Social strategies: facilitate interaction with others, often in a discourse situation	* Asking questions
		* Cooperating with others
		* Empathizing with others

Oxford considered both cognitive and metacognitive strategies necessary for efficient language learning and so they are both comprised in her framework (1990). In the context of language learning, the role of metacognition is frequently emphasized but it is not defined clearly enough. To be able to assess the learners' use of metacognitive strategies and self-regulation in general, it is important to understand the construct, its components and their interaction.

2.2 Self-regulated learning

There are several theories of self-regulated learning and numerous definitions which are important to understand the issues in this context. One of the initial, fundamental definitions comes from Bandura (1986), who incorporating it into his social cognitive theory of human behaviour, viewed *self-regulation* as the process of influencing the external environment by engaging in the functions of self-observation, self-judgment, and self-reaction. Drawing on his works, Zimmerman (1986) defined *self-regulated learning* as the process where students activate and sustain cognitions and behaviours systematically oriented toward the attainment of their learning goals. Winne (1996) accents the metacognitive perspective defining *self-regulated learning* as a metacognitively-governed behaviour where learners regulate their use of cognitive tactics and strategies. Another distinction between models of self-regulation is the postulated influence of the situation on self-regulation behaviour. Boekaerts (1997) defines *self-regulated learning* as a complex interaction between (meta)cognitive and motivational regulation. In her model that consisted of six components she differentiated both regulation systems in relation to three levels (goals, knowledge, and cognitive strategies).

The theories agree that self-regulated learning is an active and constructive process whereby students regulate different cognitive, metacognitive, motivational, volitional and behavioural processes during their learning (Winters *et al*, 2008). The numerous models of SRL that propose different constructs and conceptualizations share some general assumptions and features. Subsequently, Pintrich's framework based on Zimmerman's cyclical three-phase model and four assumptions will be explained.

2.2.1 Pintrich's conceptual framework for self-regulated learning

Pintrich's general framework for theory and research is based on four assumptions: active, constructive assumption; potential for control assumption; goal, criterion or standard assumption; and finally, mediators between personal and contextual characteristics and actual achievement or performance (2000). Drawing from these assumptions he defined SRL as an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment (Pintrich, 2000). His framework is a complete and comprehensive model that enables to describe a very complex concept of self-regulated learning. In his model Pintrich described the regulation of a learning process in four areas: cognition, motivation and affect, behaviour and context. In these areas he distinguished four phases: forethought and planning, monitoring, control and reflection. Regulation is the keyword which covers all phases and areas. Although Pintrich's framework is very elaborate and describes the system of strategies in detail, his instrument (Motivated Strategies for Learning Questionnaire) for measuring learners' strategy use which draws on his framework does not provide satisfactory factor structure or model fit indices (Davenport, 2003; Dunn *et al*, 2011; Hamilton &Akhter, 2009; Saks *et al*, 2014). That is why researchers are still looking for more reliable theories and designing more fit measuring instruments to assess learners' self-regulation (see e.g. Toering *et al*, 2012).

3. Supporting learners' self-regulated learning strategies

Acquiring sufficient self-regulated skills and this way reassuring better academic achievements (Dabbagh & Kitsantas, 2005; Schunk & Zimmerman, 1994) cannot be considered self-evident. These skills have to be instructed and supported throughout the whole learning process. This is a challenge for instructional designers and teachers to develop and apply effective strategies and encourage learners to develop their self-regulated learning skills in the learning process. The aim of the current study was to find out the most effective supports and conditions for scaffolding self-regulation reported in previous empirical studies. The following is an overview of the studies describing the most efficient interventions.

There are several effective ways to support learners self-regulation, starting with designing SRL assisted mechanisms in personalised e-learning systems (Chen, 2009) to persuasive mobile textings (Goh *et al*, 2012) and elaborated training programs (Bannert & Reimann, 2012). Based on researches attempting to support self-regulated learning Bannert identified three principles for effective intervention: first, instruction on self-regulated learning must be integrated with the domain-specific instruction being embedded in the subject matter; second, the application conditions and the usefulness of taught self-regulated learning strategies must be explained to students. Otherwise, students may feel disturbed and interrupted, and will not use them. To avoid this it is recommended to model and explain how these conditions support their learning. And third, it is important that sufficient training time is provided in order to internalize and automatize the self-regulated learning strategies and skills. (Bannert & Reimann, 2012). SRL can be supported following different principles. Hannafin distinguishes four types of scaffolds: *conceptual scaffolding* consists of aids that guide students' understanding of content. It guides learners regarding what to consider (Hannafin *et al*, 1999). *Metacognitive scaffolding* supports the underlying processes associated with individual learning management. It guides students' ways of thinking and reflecting on their task (e.g., training and prompts for self-monitoring and reflection). *Procedural scaffolding* shows how to utilize available resources and tools orienting to system features and functions. *Strategic scaffolding* involves alternative approaches to learning activity supporting analyzing, planning, strategy and tactical decisions (Hannafin *et al,* 1999).

Earlier researches have provided evidence that the most efficient support for learner's self-regulation is combined metacognitive scaffolding. Berthold (2007) used the combination of prompting and writing learning protocols for self-evaluation and feedback. Based on the results of several content

and self-report tests and content analysis of learning protocols he reported that using prompts stimulated the elicitation of cognitive and metacognitive learning strategies. Also, academic results were better in the groups who received cognitive or the combination of cognitive and metacognitive prompts. The author concluded that cognitive and metacognitive strategies are not independent of each other but complementary. Metacognitive strategies control and regulate cognitive ones (Berthold *et al*, 2007). These findings are supported by Brunstein and Glaser (2011) who also prompted using cognitive (writing) strategies with self-regulated ones. Assessing the learners' writing skills (story quality, plan, text revisions, writing knowledge) and self-efficacy they concluded that an intervention that combined the instruction of writing strategies with self-regulation skills exerted a strong, coherent, and sustainable influence on procedural (planning and revising), declarative (knowledge), and self-related (self-efficacy) aspects of writing promoting novice writers' compositional achievements. Lee and his colleagues presented a study which examined the effects of two scaffolding strategies on learners' comprehension and self-regulation (2010). They combined generative learning strategy prompts and metacognitive feedback. Based on the results of knowledge and self-report SRL questionnaire (MSQL) they summarised that generative learning strategy prompts with metacognitive feedback improved learners' self-regulation and use of generative strategies and, accordingly, their learning performance. In contrast, generative learning strategy prompts without metacognitive feedback improved only learners' use of generative strategies (Lee *et al*, 2010). Similar effective metacognitive scaffolds have also been reported by Kramarski and Michalsky (2009; 2010) and Kramarski and Gutman (2006) who used IMPROVE self-questioning model.

Metacognitive scaffolding enables to foster several self-reported aspects of SRL, including self-monitoring, strategy use and interest (Winters *et al*, 2008) whereas the best results are achieved in the combination of cognitive and metacognitive support. With this knowledge we start designing our model for supporting learners' self-regulated learning skills.

4. Model development and an example of supporting cognitive and metacognitive strategies in an ESP course

Taking the theoretical frameworks of LLSs by Oxford (1990) and self-regulated learning by Pintrich (2000) as a basis, we developed a model for supporting learners' cognitive and metacognitive learning strategies for the blended English for Specific Purposes (ESP) course. Pintrich has distinguished four areas for SRL (cognition, motivation and affect, behaviour, and context) (Pintrich, 2000). In in this study we will focus on the area of cognition and behaviour throughout all four phases. Cognitive and metacognitive strategies were supported concurrently as the evidence has shown that combined scaffolding of the two gives the best results in the support of self-regulation as well as content knowledge (Berthold *et al*, 2007; Brunstein & Glaser, 2011; Lee *et al*, 2010).

For this course, four specific language learning assignments were created to support the development of students' metacognitive and cognitive LLSs (Table 3). The assignments were specially designed to take maximum advantage of the affordances of the digital learning environment (Moodle). Special attention was paid to students' active use of language when solving problems connected with real-life situations in the tourism industry (Tasks 3 and 4). The four assignments were accompanied by other tasks which are carried out in the class in the course of regular studies: reading and analysing texts, summarizing, comparing and contrasting etc. Students' interaction and communication are encouraged throughout the whole learning process, as well as in preparatory and follow-up phases. All learning activities are reflected orally in the classroom as well as in written form in students' learning diaries.

The first assignment designed for the intervention is compiling a learning plan. It starts with oral discussion in the class where students are prompted to think on the goals they could have when starting the course, also their needs considering their level of language skills, the cognitive strategies they are used to employing when learning a language, the ways of assessing and giving feedback that could be most beneficial for them. If this is a new activity for students it is important to encourage them to open up and express their doubts and expectations. It is also important to explain why it is necessary to set goals and plan their activities beforehand. As a follow-up activity, the students, following the prompts, write their answers to the digital learning plan which will be the first

submission of their learning journals. Learning plan is not a finished document. Students are encouraged to return to it any time they feel that they could change or complete it. It is important to explain to the students that learning plan is an open document and their entries can be modified according to their needs, interests and level of development. The digital learning journal serves as a diary where students record their thoughts and impressions of the learning process. The journal, which is visible only for the learner himself and the teacher, gives information about the student's progress, problems he may face as well as his self-monitoring skills. This is also the place where the teacher can give feedback to students' progress and answer his questions.

The second assignment is writing an essay. The reason why this assignment was included in intervention was its focus on supporting reading, writing and compensation as cognitive strategies in addition to metacognitive ones. It starts with the class discussion again where the students are explained the assignment and interest towards the task is aroused. Subsequently, the prompts are used to activate students' prior content knowledge and metacognitive knowledge. This is followed by setting goals, making plans for writing and time planning. The strategy use which is prompted in the class activities is basically metacognitive. The cognitive strategies students need for writing are prompted in the digital learning environment in the form of questions and study-tips. These are accompanied by metacognitive prompting for monitoring and self-evaluating. Figure 1 illustrates a sample of metacognitive prompts on planning.

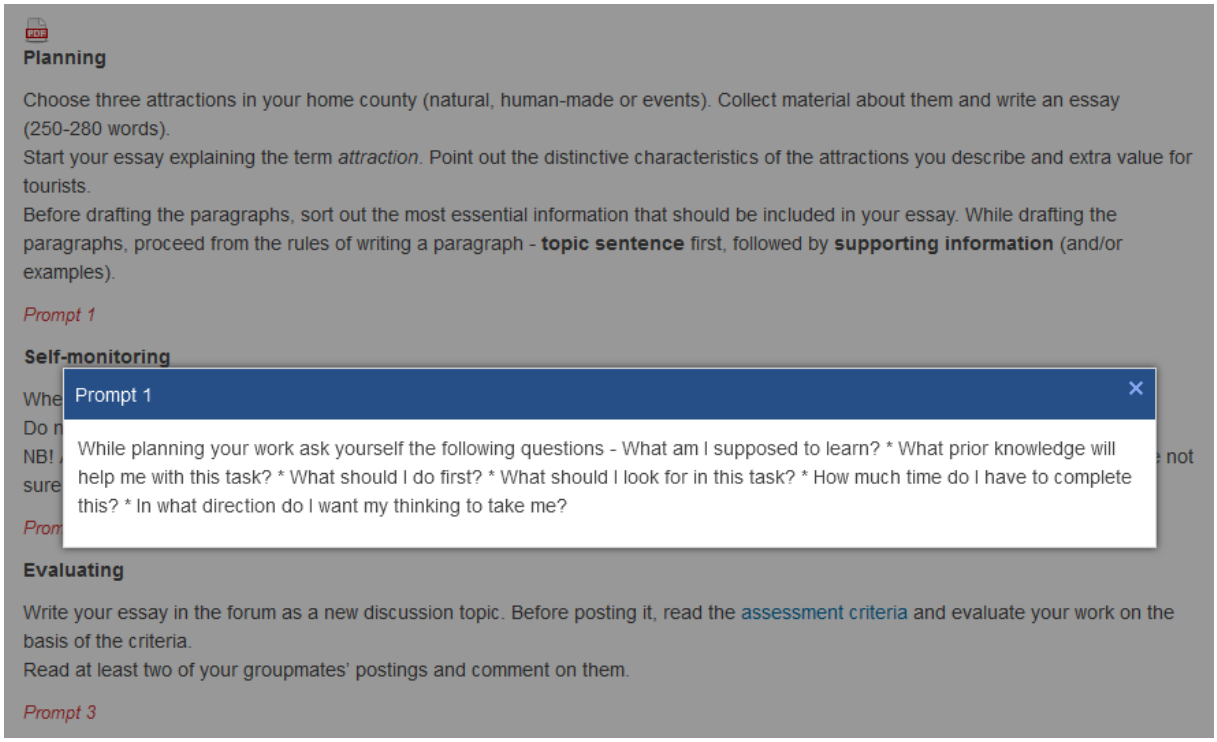


Figure 1. A sample screen capture of metacognitive prompting for Task 2.

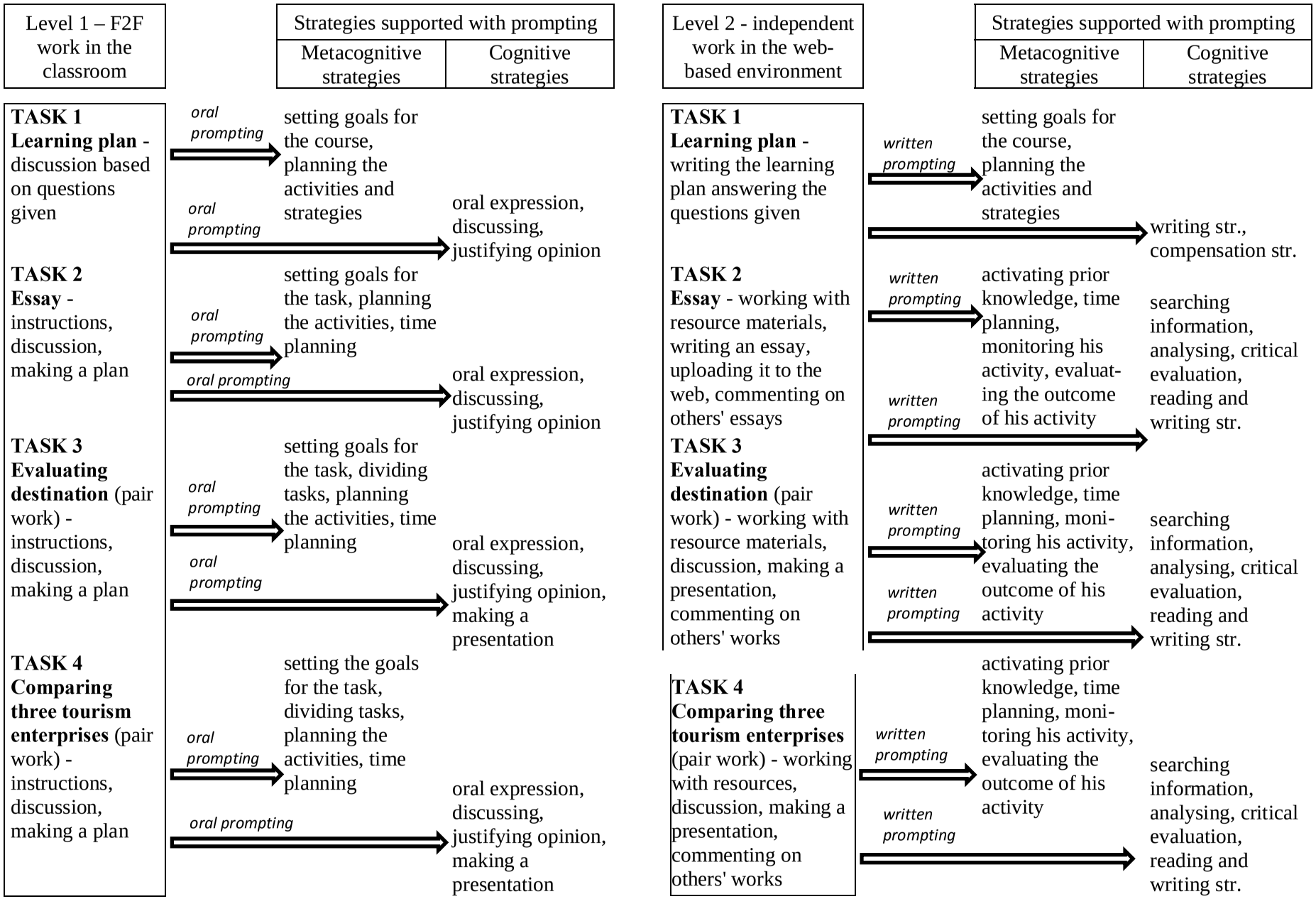
As a follow-up activitiy in the class, the discussion on the whole writing process will be encouraged. Students are asked to share the problems they faced when writing, regulation processes they took up to overcome the problems and they are also asked to self-evaluate their activity throughout the whole process.

The third and fourth assignments are both pairworks and follow the same structure – collecting information about a destination or certain tourism enterprises, compiling the summary and making a presentation on the results. The main value of this task is its possibility to connect the real-life situation with language learning. The tasks are set this way that learners have to solve authentic problems using authentic materials and be able to justify their decisions. Similarly to the previous task, they also start with the class discussion to arouse interest and activate prior content and metacognitive knowledge. Since these tasks are pairworks and students set goals, plan their activities and time schedule, and divide the tasks together, it is important to apply social and active language use

strategies. Also, the independent work in the digital learning environment which follows the preparatory work in the class, demands from students employing various cognitive and metacognitive strategies which are prompted throughout the tasks. The oral presentations in the class are followed by reflection of the whole process. Students are encouraged to share their impressions and self-evaluate their activity as an individual and as a pair.

When developing the model special attention was paid to providing the assignments with appropriate prompting, cognitive as well as metacognitive. Earlier studies have proven that the frequency of use of certain self-regulatory processes are consistently associated with learning gains, (Winters *et al*, 2008), therefore similar structure and similar logic of prompting has been used throughout the course. The model and the efficiency of the developed scaffolding will be tested within further researches.

Table 3: Model for supporting cognitive and metacognitive strategies in a blended ESP course.



Conclusion

The evidence has shown that for supporting students' language studies and proficiency and for enhancing their self-regulated learning skills, the use of their cognitive and metacognitive learning strategies has to be scaffolded (Brunstein & Glaser, 2011; Kondo *et al*, 2012; Nash-Ditzel, 2010; Wong, 2011). Based on earlier studies (Berthold *et al*, 2007; Brunstein & Glaser, 2011; Lee *et al*, 2010; Kramarski & Michalsky, 2009, 2010) we may confirm that learner's self-regulation can be supported, and the best results are provided by metacognitive scaffolds which are also the most frequently used type of scaffolding. Former studies have also proved that self-regulation is most efficiently enhanced by the combination of different strategy scaffolding, basically cognitive and metacognitive. The main utilized form of strategy support is prompting.

On the basis of the results of the analysis, a model and concrete assignments were developed to support learners' cognitive and metacognitive strategies. For intervention four specific language learning assignments were designed and accompanied with prompts. Prompting scaffolds strategy instruction in the classroom as well as in the digital learning environment. While designing the model it was considered necessary to provide various phases of the tasks with prompts of cognitive as well as metacognitive strategies. Students are supported to monitor and self-evaluate their learning activities and self-efficacy with constant discussions in the class. The model and the efficiency of the developed scaffolding will be tested within further researches.

References

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice Hall.

Bannert, M., Reimann, P. (2012). Supporting self-regulated hypermedia learning through prompts. *Instructional Science, 40,* 193-211.

Benson, P. (2011). Teaching and researching autonomy. Great Britain: Pearson Education Ltd.

Berthold, K., Nückles, M., Renkl, A. (2007). Do learning protocols support learning strategies and outcomes? The role of cognitive and metacognitive prompts. *Learning and Instruction, 17,* 564-577.

Boekaerts, M. (1997). Self-Regulated Learning: A new Concept embraced by Researchers, Policy Makers, Educators, Teachers, and Students. *Learning and Instruction, 7,* 161–186.

Brunstein, J. C., Glaser, C. (2011). Testing a Path-Analytic Mediation Model of How Self-Regulated Writing Strategies Improve Fourth Graders' Composition Skills: A Randomized Controlled Trial. *Journal of Educational Psychology, 103*(4), 922-938.

Chen, C.-M. (2009). Personalized E-learning system with self-regulated learning assisted mechanisms for promoting learning performance. *Expert Systems with Applications, 36,* 8816–8829.

Dabbagh, N., & Kitsantas, A. (2005). Using web-based pedagogical tools as scaffolds for self-regulated learning. *Instructional Science, 33*(5-6), 513-540.

Davenport, M. (2003). Modeling motivation and learning strategy use in the classroom: An assessment of the factorial, structural, and predictive validity of the Motivated Strategies for Learning Questionnaire (Doctoral Dissertation, Auburn University, 1999). *Dissertation Abstracts International, 64,* 273.

Dunn, K. E., Lo, W.-J., Mulvenon, S. W., Sutcliffe, R. (2011). Revisiting the Motivated Strategies for Learning Questionnaire: A theoretical and statistical reevaluation of the metacognitive self-regulation and effort regulation subscales. *Educational and Psychological Measurement, 72(2),* 312-331.

Goh, T.-T., Seet, B.-C., Chen, N.-S. (2012). The impact of persuasive SMS on students' self-regulated learning. *British Journal of Educational Technology, 43*(4), 624–640.

Hamilton, R., & Akhter, S. (2009). Construct validity of the Motivated Strategies for Learning Questionnaire. *Psychological Reports, 104*(3), 711-722.

Hannafin, M., Land, S., Oliver, K. (1999). Open learning environments: foundation, methods, and models. In C. M. Reigeluth (Ed.), Instructional-design theories and models: A new paradigm of instructional theory, Vol. II (pp. 115–140). Mahwah, NJ, US: Lawrence Erlbaum.

Hsiao, T.-Y., Oxford, R. (2002). Comparing theories of language learning strategies: a confirmatory factor analysis. *The Modern Language Journal, 86*(3), 368–383.

Jones, S. (1998). Learning styles and learning strategies: towards learner independence. *Forum for Modern Language Studies, 34,* 115–129.

Kiewra, K. A. (2002). How Classroom Teachers Can Help Students Learn and Teach Them How to Learn. *Theory into Practice, 41*(2), 71-80.

Kondo, M., Ishikawa, Y., Smith, C., Sakamoto, K., Shimomura H., Wada, N. (2012). Mobile Assisted Language Learning in university EFL courses in Japan: developing attitudes and skills for self-regulated learning. *ReCALL, 24*(2), 169-187.

Kramarski, B., Gutman, M. (2006). How can self-regulated learning be supported in mathematical E-learning environments? *Journal of Computer Assisted Learning 22*, 24–33.

Kramarski, B., Michalsky, T. (2009). Investigating Preservice Teachers' Professional Growth in Self-Regulated Learning Environments. *Journal of Educational Psychology, 101*(1), 161-175.

Kramarski, B., Michalsky, T. (2010). Preparing preservice teachers for self-regulated learning in the context of technological pedagogical content knowledge. *Learning and Instruction, 20,* 434-447.

Lee, H. W., Lim, K. Y., Grabowski, B. L. (2010). Improving self-regulation, learning strategy use, and achievement with metacognitive feedback. *Educational Technology Research and Development, 58,* 629–648.

Nash-Ditzel, S. (2010). Metacognitive Reading Strategies Can Improve Self-Regulation. *Journal of College Reading and Learning, 40*(2), 45-63.

O'Malley, J. M., Chamot, A. U. (1990). Learning strategies in second language acquisition. Cambridge: Cambridge University Press.

Oxford, R., Crookall, D. (1989). Research on language learning strategies: methods, findings, and instructional issues. *The Modern Language Journal, 73*, 404–419.

Oxford, R. (1990). Language learning strategies: what every teacher should know. New York: Newbury House/Harper and Row.

Pintrich, P. R. (2000). The Role of Goal Orientation in Self-Regulated Learning. In Boekaerts, M., Pintrich, P. R. & Zeidner, M. (Eds.) Handbook of Self-Regulation (pp. 531-566). Academic Press, Elsevier.

Rubin, J. (1975). What the "good language learner" can teach us. *TESOL Quarterly, 9*, 41–51.

Saks, K., Leijen, Ä., Edovald, T., Õun, K. (in press). Cross-cultural adaptation and psychometric properties of the Estonian version of MSLQ. Procedia – Social and Behavioral Sciences.

Schunk, D.H., Zimmerman, B.J. (1994). Self-regulation of learning and performance: Issues and educational applications. Hillsdale, NJ: Erlbaum

Stern, H. H. (1975). What can we learn from the good language learner? *Canadian Modern Language Review, 31*, 304–318.

Toering, T., Elferink-Gemser, M. T., Jonker L, Heuvelen, M. J. G., Visscher, C. (2012). Measuring self-regulation in a learning context: Reliability and validity of the Self-Regulation of Learning Self-Report Scale (SRL-SRS). *International Journal of Sport and Exercise Psychology, 10*(1), 24-38.

Tsai, M.-J. (2009). The Model of Strategic e-Learning: Understanding and Evaluating Student e-Learning from Metacognitive Perspectives. *Educational Technology & Society, 12* (1), 34–48.

Weinstein, C. E. (1994). Strategic learning/strategic teaching: flip sides of a coin. In Pintrich, P. R., Brown, D.R. & Weinstein C. E. (Eds.) Student Motivation, Cognition, and Learning: Essays in Honor of Wilbert J. McKeachie (pp. 257-273). Hillsdale, NJ: Lawrence Erlbaum.

Winters, F. I., Greene, J. A., Costich, C. M. (2008). Self-Regulation of Learning within Computer-based Learning Environments: A Critical Analysis. *Educational Psychology Review, 20*, 429-444.

Winne, P. H. (1996). A metacognitive view of individual differences in self-regulated learning. *Learning and individual differences, 8*, 327-353.

Wong, M. S-L. (2011). Language learning strategy use: a study of pre-service teachers in Malaysia. Retrieved from http://www.eric.ed.gov/PDFS/ED521415.pdf on 13.06.2013.

Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key subprocesses. *Contemporary Educational Psychology, 11*, 307–313.