GRANT journal
ISSN 1805-062X, 1805-0638 (online), ETTN 072-11-00002-09-4

EUROPEAN GRANT PROJECTS | RESULTS | RESEARCH & DEVELOPMENT | SCIENCE

Design-Based Research of an ESP Coursebook: Results of a Questionnaire Survey

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Grant: MUNI/A/0881/2017
Name of the Grant: Aktev VII.
Subject: AM – Pedagogika a školství

Abstract The article presents the research methodology and the first results of design-based research of a coursebook for English for specific purposes (hereinafter referred to as ESP) carried out in cooperation between the Institute for Research in School Education of the Faculty of Education at Masaryk University and the Department of Foreign Languages of the Faculty of Electrical Engineering and Communication, Brno University of Technology in Brno. Besides the gradual development of the coursebook, design-based research contributes to the development of both a dominant theory, in our case the theory of design and evaluation of ESP coursebooks and new theories leading to an educational reform not only in ESP teaching and learning. The following chapters focus on research design, research tool and samples characteristics, data analysis and interpretation resulting from a questionnaire survey.

Keywords Design-based research, ESP coursebook, intervention, iteration, design principles, evaluation criteria checklist, questionnaire survey

1. RESEARCH DESIGN

Design-based research (hereinafter referred to as DBR) can be characterised as systematic implementation, analysis, evaluation and development of a an educational intervention, i.e. a coursebook *English for Information Technology* (Ellederová, 2016) in order to advance our knowledge about the characteristics of an optimal version of the coursebook and to address the issue of the process of its design and evaluation by means of the production of design principles. The coursebook will be repeatedly implemented in the course English for IT for the students of the first year of the Bachelor's study programme English in Electrical Engineering and Informatics at the Faculty of Electrical Engineering and Communication, Brno University of Technology (hereinafter referred to as FEEC BUT).

The general objective of my DBR of the coursebook *English for Information Technology* is *to establish a link between the design of the coursebook and its iterative testing* (repeated implementation of the coursebook in the course English for IT) *for the purpose of evaluation and re-design of the coursebook* so that it would be the most appropriate teaching and learning tool for the target group of students. The intermediate objectives of my DBR are two:

1) evaluation of the coursebook with *the aim to collect information about its quality* by means of checklists and didactic pre-tests and post-tests;
2) a development cycle of the coursebook with *the aim to optimise the coursebook quality* by means of the production of substantive design principles (characteristics of the coursebook design itself) and procedural design principles (characteristics of the coursebook design approach).

On the one hand, the research is closely connected to the application sphere and, on the other hand, it includes the evolutionary production of specific procedures and tools, which may result in reflection upon the production of design principles and developing the existing theories of the coursebook design.

My research design is divided into one preparation stage and three realization stages. The preparation stage focuses on gaining an insight into the state of the art of DBR of learning materials for ESP. Based on the literary research and establishing the conceptual framework, a research problem and research questions were formulated, and research samples and data collection methods selected. The aim of the *preparation stage* is to design data collection tools, which include (a) identification and elaboration of a checklist for evaluating the coursebook, (b) transformation of the checklist into questionnaire items and (c) design of didactic pre-tests and post-tests to verify knowledge and skills acquired by the students before and after using the coursebook.

The *first realization stage* involves implementation of the coursebook into lessons, and consists of these four stages which at the same time involve verification of research tools (a questionnaire and didactic tests):

1) evaluation of the coursebook by teachers,
2) pre-testing of students,
3) students' evaluation of the coursebook by means of a questionnaire survey,
4) post-testing of students.

The first realization stage is followed by the first data analysis and interpretation.

The research requires iterative cycles of the stages, which will provide the opportunity to reflect and establish what dimensions of each intervention were "non-negotiable" or essential components at the core of each intervention that could not be changed. Therefore, the *second realization stage* involves repeated implementation of the

coursebook and the second iteration, i.e. redesign of the coursebook, its evaluation by teachers and students, pre-testing and post-testing of students and the second data analysis and interpretation. The *third realization stage* consists of two parts – the production of substantive and procedural design principles. The aim of this last stage is to characterize the optimal coursebook design, optimal research design and to draw up recommendations designed to improve educational practice.

The following chapters deal with one part of my research design: evaluation of the coursebook by means of a questionnaire survey conducted during the first iteration. The second chapter describes a research tool and research samples. The third chapter provides data analysis from which the substantive design principles result alongside with comparison of teachers' and students' responses.

2. RESEARCH TOOL AND RESEARCH SAMPLES

One of the intermediate objectives of my research design is evaluation of the coursebook by means of checklists which examine different aspects of the coursebook. To evaluate the coursebook by teachers and students, an *evaluation criteria checklist* was developed based on my own design as well as on the checklists created by such developers as Cunningsworth (1995), Sikorová (2007), Mol and Tin (2008), McDonough et al. (2013), and Danaye Tous and Haghigi (2014).

Twenty-four criteria have been clustered into the following six categories:

1) general aims;
2) clear arrangement;
3) accuracy;
4) learners' needs including three sub-categories:
   a) adequacy,
   b) learning guidance,
   c) motivational characteristics;
5) language content;
6) language skills.

Characteristics of each category summarised in Table 1 were defined on the basis of synthesis of scientific knowledge from different sources (Dudley-Evans & St John, 1998; Harmer, 2007; Hutchinson & Waters, 1987; Knecht & Janík, 2008; Maňák & Knecht, 2007; Průcha, 1998; Rada Evropy, 2001; Rinder, Geslin, & Tual, 2016; Scrivener, 2005; Sikorová, 2007a, 2007b; Tomlinson 2010, 2011; Ur, 1996).

The evaluation criteria checklist (see Table 2) was transformed into the questionnaire items presenting the respondents with a five-level Likert scale (from strongly agree to strongly disagree). Each item included a box "Reasons Given," where respondents should explain why they specified the particular level of agreement or disagreement. Respondents could also add more comments on and/or objections to the coursebook itself.

The *questionnaire for teachers* focused on all above-mentioned categories of the evaluation criteria checklist. The *questionnaire for students* included twenty items focusing primarily on the category "Learners' Needs". Categories "General Aims" and "Accuracy" were left out because students' evaluation of the coursebook regarding these categories might be irrelevant.

Table 1: *Characteristics of each category of the evaluation criteria checklist*

	Category	Characteristics
I	General aims	The aims of the coursebook are clearly determined and they correspond closely with the aims of the course English for IT. The coursebook enables learners to acquire linguistic means, language functions and language skills which they will use in different situations: in the subjects specialised in the field of information technology, while defending their Bachelor's thesis, communicating with colleagues, business partners and companies in the competitive international business environment of the information technology sector
II	Clear arrangement	The coursebook is a hierarchically structured system whose individual interconnected components perform their individual functions. The coursebook is divided into separated thematic chapters (listed in the table of contents) where each chapter includes a wordlist and an answer key. Each topic, text and task in the coursebook follows a logical sequence. Consolidation/Revision of subject matter is always integrated after the previous whole. Supplementary learning materials are differentiated from the primary learning material.
III	Accuracy	Both linguistic content (real content) and professional content (carrier content) in the coursebook are correct.
IV	Learners' needs:	
	A) Adequacy	Subject matter in the coursebook (texts, tasks, vocabulary) is adequate to the language level of learners (B1 according to *CEFR*) and to the professional level of learners (field of information technology). Texts and tasks in the coursebook can be accomplished within the time allowed.
	B) Learning guidance	The coursebook contains graphic symbols for different types of tasks, colour differentiation of different parts of the text, bold/italics highlighting parts of the text (e.g. key vocabulary). Tasks follow individual topics/texts. Each lesson begins with a warming-up activity that serves for stimulating learners and making them focus on a new topic (e.g. questions opening up creative thinking related to the particular topic). The coursebook contains problem-solving tasks, discovery and creative activities. Tasks in the coursebook allow learners to work individually, make a self-evaluation (e.g. with the help of the answer key), work in pairs and groups. The coursebook contains enough tasks for revision and reinforcement. Visuals (images, photos, drawings, charts, graphs, etc.) in the coursebook are not purely decorative since they perform a language learning and educational function.
	C) Motivational characteristics	Topics in the coursebook are authentic and they relate to study and professional purposes. Tasks in the coursebook allow learners to use a professional English language in authentic professional situations outside the classroom. Texts and tasks in the coursebook are stimulating and motivating.
V	Language content	The range of professional vocabulary in the coursebook is adequate. Texts and tasks support vocabulary learning strategies (e.g. through the presentation of professional vocabulary in texts and tasks and with visuals). The coursebook contains enough tasks for the acquisition of linguistic means for expressing different rhetorical functions which allow learners to describe and give effective instructions about specific processes and methods, to classify and compare different devices within the field of information technology, etc.
VI	Language skills	Reading and listening material as well as material for speaking activities are adequately covered. There is a focus on the development of reading (e.g. reading for gist, specific information and prediction), listening (e.g. listening for gist and specific information in monologues, dialogues and discussions) and speaking (e.g. giving a clear and well-structured presentation, interacting effectively on a range of topics within the field of information technology) skills and strategies[1].

[1] The term "strategy" is used in different ways. Here, the strategy refers to self-generated thoughts, feelings, and actions, which are systematically oriented toward attainment of the learners' goals.

Table 2: *Evaluation criteria checklist for evaluating the coursebook English for Information Technology*

Category		Criterion
I	1	Do the aims of the coursebook correspond closely with the course aims concerning the language use?
	2	Do the aims of the coursebook correspond closely with the course aims concerning the professional content?
II	3	Is the external layout (logical sequencing of chapters, topics, vocabulary) clear?
	4	Is the internal layout of texts and tasks clear?
III	5	Is the subject matter correct and accurate regarding language/professional[2] (field of information technology) content?
IV		
A	6	Is the level of texts and tasks adequate to the language level of students?
	7	Is the level of texts and tasks adequate to the professional level of students?
B	8	Are different text features for guiding attention (e.g. different typefaces for distinguishing types of subject matter, bold print for highlighting key vocabulary) used in the coursebook?
	9	Do the tasks require problem solving and creative activities?
	10	Does the coursebook contain pairwork or groupwork tasks?
	11	Does the coursebook contain individual work tasks (e.g. those including the answer key for self-monitoring)?
	12	Are the visuals used as an integral part of teaching material?
	13	Does the coursebook contain enough tasks for recycling and reinforcement?
C	14	Are the topics in the coursebook authentic and do they correspond closely with the students' field of study (e.g. examples from real-life situations, importance of knowledge and skills for the future IT career)?
	15	Are the texts and tasks interesting for students?
V	16	Is the range of professional vocabulary in the coursebook adequate?
	17	Does the coursebook support vocabulary learning strategies (e.g. presentation of vocabulary in the text, tasks, with visuals)?
	18	Does the coursebook contain enough tasks for students to acquire linguistic means for expressing different rhetorical functions (e.g. description, classification, comparison)?
VI	19	Is reading material adequately covered?
	20	Is there a focus on the development of reading skills and strategies?
	21	Is listening material adequately covered?
	22	Is there a focus on the development of listening skills and strategies?
	23	Is material for speaking adequately covered?
	24	Is material for speaking (dialogues, role plays, etc.) well designed to equip learners for real-life interactions?

During the first iteration, the designed questionnaire was piloted with teachers of English language and teachers of information technology and telecommunication courses taught in English at FEEC BUT. All collected data was managed and analysed in *IBM SPSS Statistics 25.0*. To analyse the reliability of the questionnaire, the two methods were used. First, *Cohen's kappa coefficient* (κ), which measures inter-rater agreement for categorical items, was calculated. The raters were two experienced teachers with more than ten-year experience in teaching ESP at universities and linguistic research in English for electrical engineering and information technology. After modification of the first version of the questionnaire, Cohen's kappa $\kappa = 0.86$ (91.67 % of inter-rater agreement) was obtained, which indicates the "almost perfect" level of inter-rater reliability according to Landis and Koch (1977, p. 165). Internal consistency of the questionnaire was measured by means of *Cronbach's alpha* which tests to see if multiple-question Likert scale surveys are reliable. Cronbach's alpha showed the questionnaire to reach good reliability, $\alpha = 0.86$.

[2] Language accuracy will be evaluated by teachers of English language; professional content will be evaluated by teachers of information technology and telecommunication courses.

The research sample "Teachers" consisted of 13 respondents. The respondents who worked as lecturers prevailed (53.85 %). The length of teaching experience varied from six to ten years (23.80 %) and eleven to fifteen years (23.08 %). Ten respondents were teachers of English language and three respondents were disciplinary teachers of information technology and telecommunication courses taught in English. The research sample "Students" consisted of 23 respondents. Most respondents studied English for six to ten years (47.83 %) and they successfully passed the state school-leaving exam in English language (60.87 %). Two respondents held a Cambridge English Qualification: one of them had the First Certificate in English (FCE) and the other had the Certificate in Advanced English (CAE). At the end of the semester respondents received a printed version of the questionnaire which they should fill in at home and bring back to the lesson in which they took the post-test.

3. DATA ANALYSIS AND INTERPRETATION

This chapter focuses on analysis and interpretation of data in categories evaluated by both teachers and students. Comparing each category of the evaluation criteria checklist based on teachers' and students' evaluation of the coursebook, certain differences and similarities can be found as illustrated in Figures 1 to 7. The category "Clear Arrangement" (see Figure 1) was evaluated by teachers more positively than by students: 80.77 % teachers strongly agreed with this characteristic of the coursebook while only one half of students (56.52 %) strongly agreed

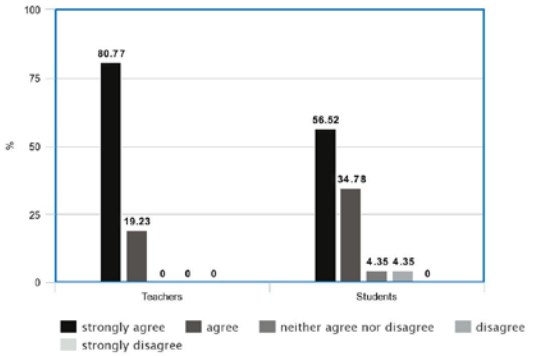

Figure 1. Teachers' and students' evaluation of clear arrangement of the coursebook.

As the chart in Figure 2 shows, teachers tended to strongly agree (65.39 %) with the optimal adequacy more than students (23.92 % strongly agreed). However, more students (52.18 %) agreed than teachers (23.08 %).

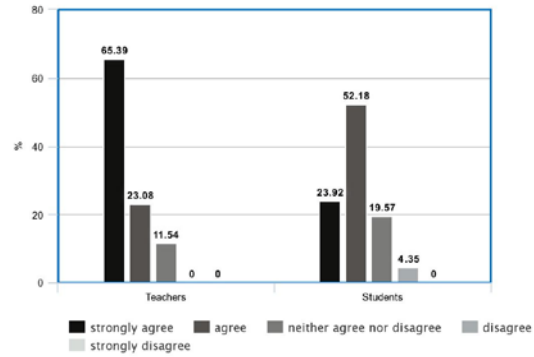

Figure 2. Teachers' and students' evaluation of adequacy of the coursebook.

There were no significant differences between teacher's and students' evaluation in the case of the category "Learning Guidance" where the degree of complete agreement was observed in about half of the respondents in both research samples and about 30 % respondents in both research samples agreed (see Figure 3).

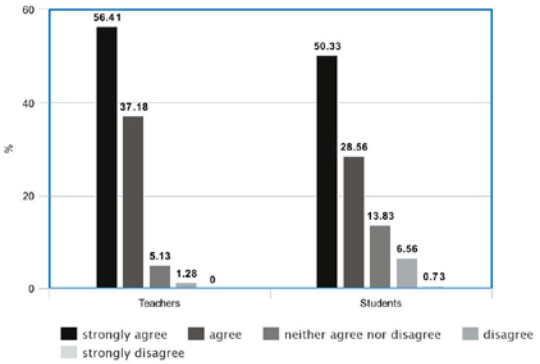

Figure 3. Teachers' and students' evaluation of learning guidance provided by the coursebook.

Comparison of the category „Motivational Characteristics" shows similar results in both groups of the respondents (see Figure 4) where there is no difference between a percentage of „strongly agree" (35 %) and „agree" (39 %). Despite this fact, in the case of the criterion concerning the attractiveness of texts and tasks students were more positive (almost 70 % strongly agreed and agreed) than teachers (0 % strongly agreed and 46.15 % agreed). One of the reasons might be that students have a better understanding of the topics and issues relating to their field of study than teachers of English language who made up 77 % of the research sample "Teachers".

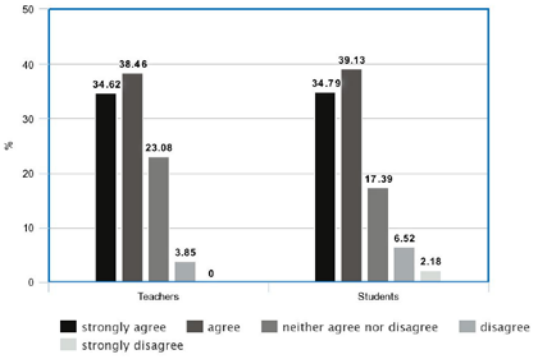

Figure 4. Teachers' and students' evaluation of motivational characteristics of the coursebook.

Regarding the motivational characteristics of the coursebook, students were more positive than teachers in the open-ended questions of the questionnaire: "I will definitely use a great deal of acquired knowledge in the future. Most things were interesting due to the fact that I chose to study IT."; "The coursebook covers enough topics from the IT field, so everybody should find 'their own cup of tea'."; "Some tasks were less interesting because I wasn't not interested in the particular IT issue, but overall, all topics were interesting."; "'Interesting' might be exaggerated, but texts and tasks weren't boring."; „Regarding English coursebooks, the attractiveness of texts and tasks is above average…". The following examples illustrate slightly different teachers' opinions about the motivational characteristics: "The question whether the texts and tasks are interesting for students depends on the needs of the individual."; "Whether or not the texts and tasks are interesting varies from individual to individual."; "The attractiveness of the texts and tasks depends on the level of students' professional knowledge."

Regarding the category "Language Content" (see Figure 5), the rate of respondents who strongly agreed or agreed was about 88 % in both research samples. Both research samples commented favourably on the professional vocabulary range in the open-ended questions, as shown in the following statements by students, "The range of professional vocabulary is adequate. My vocabulary learning went smoothly with the help of the coursebook."; "I didn't know quite a lot of words before and I learned something new."; "We will need all those professional vocabulary terms for our future jobs in the IT sector. It's easier to remember vocabulary if every key word is repeated frequently throughout the particular unit…" and teachers, "Concerning the support of vocabulary learning strategy, the combination Topic + Vocabulary Practice + Wordlist is excellent…"; "I positively evaluate vocabulary practice in the coursebook…". Both teachers and students shared their opinion about the need to add more tasks for acquiring linguistic means for expressing different different language functions.

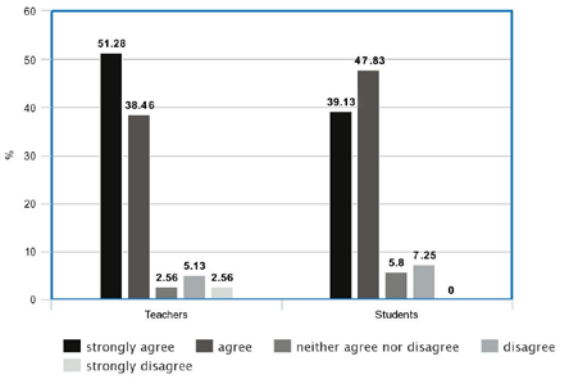

Figure 5. Teachers' and students' evaluation of language content of the coursebook.

Somewhat bigger differences could be observed in evaluation of language skills (see the chart in Figure 6). While over 60 % of teachers strongly agreed with this quality of the coursebook, 40 % of students strongly agreed or agreed. The biggest differences were noticed in the item concerning the development of listening skills and strategies (only 17.39 % of students strongly agreed compared to 61.54 % teachers) where students recommended to modify the listening tasks so that they could allow them to develop listening skills and strategies.

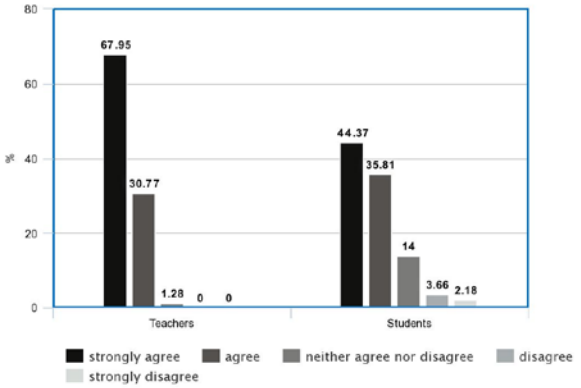

Figure 6. Teachers' and students' evaluation of language skills practised in the coursebook.

The charts illustrating the overall evaluation of the coursebook by teachers and students (cf. Figure 7) indicate that requirements of both groups of respondents slightly differ. Over 90 % of teachers strongly agreed or agreed with the overall quality of the coursebook, whereas the percentage of students who either strongly agreed or

agreed was about 40 %.

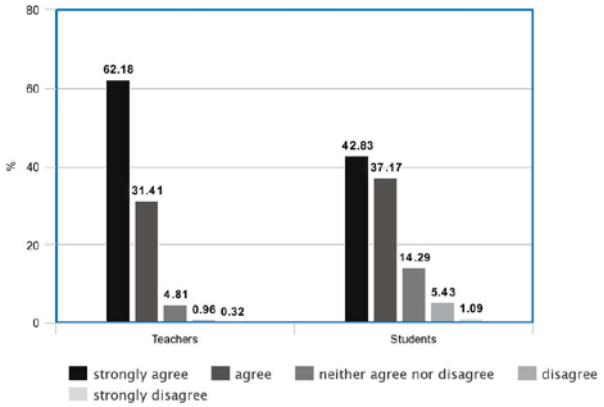

Figure 7. Teachers' and students' overall evaluation of the coursebook.

4. CONCLUSION

My research results have revealed that research of coursebooks should not ignore the opinions of students who might represent an interesting and valuable source for evaluating and designing coursebooks as some of the other research findings show (e.g. Wright, 1983, 1990; Nitsche, 1992; Kim, 2004; Knecht, 2006; Hrabí, 2007; Baleghizadeh & Rahimi, 2011; Danaye Tous & Haghigi, 2014). Students' recommendations and requirements may not only complement teachers' comments, but also differ significantly in some cases.

The analysis of the quantitative and qualitative data collected with the questionnaire has confirmed some of our research assumptions. Based on the synthesis of quantitative data and particular statements in both research samples, the following modifications of the coursebook will have to made:

- add more tasks for the acquisition of linguistic means for expressing different rhetorical functions;
- increase the level of difficulty of listening passages and add more tasks which will enable students to develop listening skills and strategies;
- add more problem-solving tasks;
- add more tasks for recycling and reinforcement;
- adapt (or add) some tasks that will enable students to work individually.

Furthermore, implementing the teachers' recommendation, graphic design of the coursebook is necessary to modify (e.g. differentiate tasks for each language skill using graphic symbols, change the layout of some texts and tasks) and phonetic transcription should be included in the wordlists. Other modifications of the coursebook content and form will result from the next part of my research design whose aim is to evaluate the coursebook quality by means didactic pre-testing and post-testing of students' knowledge and skills they had before and after using the coursebook. Then re-design of the coursebook will follow and the second iteration including implementation of the coursebook in the lessons, its repeated analysis and evaluation leading to the production of design principles.

Sources

1. Baleghizadeh, S., & Rahimi, A. H. (2011). Evaluation of an ESP textbook for the students of sociology. *Journal of Language Teaching and Research, 2*(5), 1009–1014.
2. Danaye Tous, M., & Haghigi, S. (2014). Evaluation of ESP textbooks: Evidence from ESP textbook of computer engineering major. *International Journal of Research Studies in Language Learning, 3*(2), 55–68.
3. Dudley-Evans, T., & St John, M. J. (1998). *Developments in English for specific purposes.* Cambridge: Cambridge University Press.
4. Ellederová, E. (2016). *English for Information Technology*. Brno: VUT FEKT.
5. Harmer, J. (2007). *The practice of language teaching.* Pearson: Harlow.
6. Hrabí, L. (2007). Názory žáků a učitelů na učebnice přírodopisu. *Pedagogická orientace, 17*(4), 28–34.
7. Hutchinson, T., & Waters, A. (1987). *English for specific purposes. A learning-centred approach.* Cambridge: Cambridge University Press.
8. Kim, H. D. (2004). Learners' opinions on criteria for ELT materials evaluation. *English Teaching, 59*(3), 3–28.
9. Knecht, P. (2006). Hodnoceni učebnic zeměpisu z pohledu žáků 2. stupni základních škol. In J. Maňák & D. Klapko (Eds.), *Učebnice pod lupou* (pp. 85–96). Brno: Paido.
10. Landis, J. R., & Koch, G. G. (1997). The measurement of observer agreement for categorical data. *Biometrics, 33*(1), 159–174.
11. Nitsche, C. G. (1992). A teacher and his students examine textbooks. In J. G. Herlihy (Ed.), *The Textbook Controversy: Issues, aspects and perspectives* (pp. 113–120). Norwood: Ablex Publishing Corporation.
12. Průcha, J. (1998). *Učebnice: Teorie a analýzy edukačního média. Příručka pro studenty, učitele, autory učebnic a výzkumné pracovníky.* Brno: Paido.
13. Rada Evropy. (2001). *Společný evropský referenční rámec pro jazyky*. Olomouc: Univerzita Palackého v Olomouci.
14. Rinder, J., Geslin, T. S., & Tual, D. (2016). A framework for language and communication in the CDIO syllabus. In J. Rinder (Ed.), *Proceedings of the 12th International CDIO Conference* (pp. 17–32). Turku: Turku University of Applied Sciences.
15. Scrivener, J. (2005). *Learning teaching. A guidebook for English language teachers.* Oxford: Macmillan.
16. Sikorová, Z. (2007a). *Hodnocení a výběr učebnic v praxi.* Ostrava: Ostravská univerzita.
17. Sikorová, Z. (2007b). Návrh seznamu hodnotících kritérií pro učebnice základních a středních škol. In P. Knecht & J. Maňák, *Hodnocení učebnic* (pp. 31–39). Brno: Paido.
18. Tomlinson, B. (2010). Principles of effective materials development. In N. Harwood (Ed.), *English language teaching materials. Theory and practice* (pp. 81–108). Cambridge: Cambridge University Press.
19. Tomlinson, B. (Ed.). (2011). *Materials development in language teaching*. Cambridge: Cambridge University Press.
20. Ur, P. (1996). *A course in language teaching. Practice and theory.* Cambridge: Cambridge University Press.
21. Wright, D. R. (1983). Why not ask the pupils? *Multicultural Teaching, 2*(1), 31–32.
22. Wright, D. R. (1990). The role of pupils in textbook evaluation. *Internationale Schulbuchforschung, 12*(4), 445–454.