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# Ratings of usability of didactic models: a comparative case study in Croatia and Germany

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**ABSTRACT**

The study refers to the unfavourable reputation and status of general didactics as well as its decreasing importance in teacher education. This is a result of poor performance achieved in international tests by students. They score low on knowledge and arguments, and empirical studies indicate that didactic models are *useless*. In view of the above problem, the aim of this article is to examine the validity of the argument that didactic models are useless. It is necessary to examine if general didactics are being in an unfavourable position along with its possible successors in the international context. In order to achieve that, we conducted an empirical study into the usability of didactic models for lesson planning in Croatia and compared it with the results obtained in previous research in Germany. The term *usability* means the advantages of theory in practice. On the basis of the results of the empirical study, we concluded that didactic models are not generally unusable. Additionally, they are different according to their usability. These results open a path for further research on this topic in the international context.

**KEYWORDS**

General didactics; didactic models; usability; global reform process of standardization of education; education standards

## Introduction

Didactics as a scientific discipline originated in the German[1] tradition of theorizing instruction, meaning the organized process of teaching and learning (especially in schools). In Germany and the countries influenced by the German didactic tradition (with Croatia being one of them), that is, the educational tradition of central and northern Europe (Gundem, 2010), general didactics has traditionally been the most important science in the context of teaching and learning, particularly with regard to teacher education and curriculum (teaching plan and programme) development (Arnold, 2012; Wernke, Werner, & Zierer, 2015; Zierer & Wernke, 2013). Although there is no unambiguous interpretation of the topic, objective, methodology and system of didactics as a scientific discipline, it is possible to identify different schools, traditions and models. Accordingly, there are different definitions of didactics, all of which claim to have legitimacy in the historical and contemporary context (Gundem,

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2010; Künzli, 2000). We use the classical and general definition of didactics as a *science of teaching* (Wernke et al., 2015). One of the most important tasks of didactics is to plan the teaching and learning process (Zierer & Seel, 2012) as an institutionalized, professionalized, specifically intended and mainly planned activity. Hence, planning has always been important in the context of teacher education and research into professionalization (Danielson, 2007; Wernke et al., 2015). A key element of general didactics refers to *didactic models* or models of lesson planning as tools (forms, heuristics, rules, schemata, classification patterns and interpretative views) for analysing, planning and preparing the process of teaching and learning (Künzli, 2000). Didactic models of lesson planning, due to their pragmatism and ability to depict and compress (abridge) the educational reality (Wernke et al., 2015; Zierer & Wernke, 2013), help us structure and reduce the complexity of reality. They are based on theory and at the same time have the function of directing teaching activities. In this respect, modelling is an important, if not to say crucial, *bridge between theory and practice* (Wernke et al., 2015; Zierer & Wernke, 2013).

The starting point for this article lies in the unfavourable reputation and status of general didactics (both in the academic community and in recent educational reforms) as well as its decreasing importance in teacher education. General didactics, traditionally viewed as the science of teaching, which is characteristic of its normative and theoretical approach, has found itself in a difficult position amid today's global reform process of the *standardization of education*[2] (Hopmann, 2007; Wernke et al., 2015; Zierer & Seel, 2012). The increasing dissatisfaction with general didactics has to be taken into account and can be attributed to following points:

(a) poor achievements on international tests of student knowledge (PISA, TIMMS) in Germany and other countries influenced by the German didactic tradition in education,
(b) arguments stemming from the uselessness of didactic models as indicated in the previous empirical studies,
(c) the fact that, for the last several decades, the development of didactic knowledge has been modelled as mere differentiation between the existing theories and models (Wernke et al., 2015; Zierer & Seel, 2012) and thus created,
(d) the problem of identity and the scientific status of pedagogy and didactics (Palekčić, 2001, 2010, 2012, 2015a,b).

Consequently, all of this has led to the didactic tradition being left out of recent reforms without a significant role. Relevant literature calls the future of general didactics into question and suggests possible successors, such as educational psychology, educational standards or subject didactics (Hopmann, 2007; Palekčić, 2007b; Zierer & Seel, 2012).

## Theoretical framework

The history of didactics is very rich, starting with Plato's *Meno* (Hopmann, 2007) and reaching all the way to the numerous didactic theories and models developed in the second half of the twentieth century. Despite their multiplicity and diversity, two theoretical lines and three accompanying models—Klafki's *critical-constructive didactics* (Perspective Schema Model) and Heimann's *learning-centred didactics* (Berlin Model)/Schulz's *teaching-centred didactics* (Hamburg Model)—represent the central theories and models in general didactics, since they have dictated discussions in general didactics for almost 40 years. More importantly,

they are still influential today (Zierer & Seel, 2012). Furthermore, didactic models are an important part of general pedagogical knowledge, which is fundamental for professional teaching (Shulman, 1986, 1987). For example, recent initial results concerning the practical impact of didactic models on the lesson planning competencies of teacher training students have shown that students who use these models for support in planning their lessons describe more specific learning aims und are much better able to adjust the whole lesson to the special needs of the learning group (Werner, Wernke, & Zierer, 2017). For these reasons, we examined the usability of these models in this empirical study. It focused on the Hamburg Model, the Berlin Model, and the Perspective Schema Model due to their importance in German didactics and the fact that they are the only ones mentioned in every relevant textbook (Zierer, 2012).

There are no studies on the usability of didactic models in the international context. A comparison of results obtained in Germany (the cradle of didactics) and Croatia (a country that belongs to the European didactic tradition but has not been deprived of the influence of other traditions in education) should thus afford a new and wider perspective on this topic. Additionally, we will examine the validity of the argument that didactic models are useless in the context of standardization of education.

The challenges for didactics in the context of current reform processes in standardization of education outlined above represent an issue that fits into a broader context of relationships between the two dominant educational traditions: *the European (German) tradition of didactics* and *the Anglo-Saxon tradition of curriculum and instruction*—with educational standards representing a continuation of the latter. To put it more precisely, in the European didactics context, recent educational reforms follow the tradition of Robinsohn's reform of education as a revision of curriculum, for the first time introducing the term *curriculum* into the didactically marked tradition of using the European term *teaching plan and programme* (Jurčić, 2012; Palekčić, 2005, 2006; Previšić, 2007a; Zierer & Seel, 2012). Since educational standards represent a continuation of the Anglo-Saxon curricular reforms, it can be said that the required introduction of educational standards implies a series of tensions between the dominant Anglo-Saxon and the European plan and programme tradition, that is, didactics, with *education*[3] as the central concept. This is because the relationship between the two traditions is so complex, multi-layered and dynamic (Palekčić, 2009).

First of all, it should be noted that terms such as *didactics* and *curriculum* are strongly culturally marked. Hence, comparing their meanings between languages is rife with various difficulties (Hudson, 2007; Kansanen, 1995; Palekčić, 2007a; Reid, 1998/2002). Although they are related to the same practical field and deal with similar issues (Hopmann & Riquarts, 1995b; Kansanen, 1995; Palekčić, 2007a), there are important differences in the ways they raise the questions and seek the answers (Palekčić, 2007a; Westbury, 1995, 1998/2002, 2000). The main differences between traditions stem from their origin. To be specific, in the didactic tradition the education of grammar school teachers was based on the state-structured curriculum (teaching plan and programme), but in the tradition of curriculum and instruction it was based on the issue of school system management and control (Ibid). In brief, *curriculum* provides the structural framework for thinking about the institution and refers to the system and the broader social and cultural needs, whereas *didactics* provides a framework for the teacher's thinking about the fundamental questions of his or her work (e.g. *how*, *what* and *why*) and refers to the transformation of curriculum (teaching plan and programme) contents into educational contents.

In addition, Palekčić notes that the *question of whether the two traditions are complementary or separated* remains open if one expects a single answer (Palekčić, 2007a).

With regard to what the tradition of didactics can learn from the tradition of curriculum and instruction and vice versa, Zierer & Seel (2012) highlight three important aspects. The first aspect is the *theoretical orientation* of didactics, which is achieved with the help of hermeneutical approaches. In fact, almost all of the models of general didactics have a very strong theoretical foundation, and the best example of this is Klafki's critical-constructive didactics, developed on the basis of his theoretical concept of education (Zierer & Seel, 2012). The second aspect, according to the authors, is the *process orientation* of curriculum and instruction models, achieved by integrating empirical research approaches. Therefore, the dialogue between the two traditions should try to achieve a mutual opening in terms of both theoretical concepts and research methodology. The third aspect is the most important lesson the two traditions can learn from each other—their *openness for specific theories and approaches from the other discipline in its specific cultural context*.

Although the Anglo-Saxon tradition of curriculum and instruction could learn a lot from the European tradition of didactics and vice versa, this requires a lot of effort, as each tradition is rooted in *the peculiarities of national histories, habits, and aspirations* (Reid, 1998/2002). The points of contact between the two traditions are also almost always marked by the appearance of certain conflicts (Kansanen, 1995). Similarly, Westbury (2000, p. 37) notes that given their different cultural starting points, any attempt to connect these two traditions firmly into a common framework, to consider them as *merely two sides of the same coin,* is not justified and would cause a tension in every potential point of connection. Despite the possibilities for a fruitful interaction between the two traditions, there is no way to reconcile the tradition of didactics with the tradition of curriculum and instruction because the former does not include the concept of *restrained teaching* based on the term *education* as a subjective formation, a *difference between educational content and meaning*, and the *autonomy of teaching and learning.* In other words, the tradition of curriculum and instruction can exist even without these three conditions, while the didactic tradition cannot (Westbury, 2000, p. 121).

In light of the main similarities and differences between the European tradition of didactics and the Anglo-Saxon tradition of curriculum and instruction, as well as the controversial issue of their complementarity or separation and opportunities for their fruitful dialogue, it may be concluded that in certain respects the two traditions are complementary and can learn a lot from each other. However, it should be remembered that they have different cultural starting points, making it difficult to initiate a dialogue between them.

## Literature review

Besides outlining the theoretical framework, we would like to take a look at relevant empirical research. School instruction is institutionalized, professionalized, intentional to a high degree and largely systematic (Terhart, 2009; Zierer, 2010). Hence, planning activity has always been an interesting topic within the context of teacher education and professionalization research, as it occupies a key position in the instructional process. Studies on teachers' lesson planning activities appeared in the 1980s. Several studies with different methodological approaches have since been conducted in the US and Germany on this topic. There have been questionnaire studies (e.g. Zahorik, 1975), case studies (e.g. Toomey, 1977), observations (e.g. Yinger,

1978), interview studies (e.g. Clark & Elmore, 1979), think-aloud protocols (e.g. Bromme, 1981), document analyses of written lesson plans (e.g. Morine, 1976), and video-based stimulated recall interviews (e.g. Mischke & Wragge-Lange, 1987). They have been conducted both in the form of laboratory studies with fictive content or students (e.g. Peterson, Marx, & Clark, 1978) and in natural settings. All of these studies can be divided into two phases: *earlier research into teachers' lesson planning activities* and *recent research into the usability of didactic models*. In the earlier studies, the focus was not primarily on the usability of the models, and conclusions concerning their usability were therefore made indirectly (Bromme, 1981; Clark & Elmore, 1979; Haas, 1992, 1998; Morine, 1976; Morine-Dershimer, 1979; Peterson et al., 1978; Sageder, 1992; Seifried, 2009; Toomey, 1977; Wengert, 1989; Yinger, 1978; following Wernke et al., 2015; Zahorik, 1975; Zierer & Wernke, 2013). The results of these studies lead to the conclusion that the models of lesson planning are generally unusable, irrespective of the education tradition they belong to.

This conclusion should be viewed with a critical eye for several reasons: First, it suggests that the models do not play a role in the planning activities of teachers. The models are admittedly not implemented one-to-one, but this is not something any author has ever demanded. Moreover, if one considers the results of the studies in detail, it becomes clear that aspects of didactic models can very well be found in teachers' planning. Bromme, for instance, summarizes that although teachers structure their plans according to the course of the lesson, "they also consider the other circumstances described in the Heimann-Otto-Schulz schema that precede the decision on the course" (Bromme, 1980, p. 155, translation). Similarly, Haas comes to the conclusion that "teachers necessarily observe didactic criteria, but the planning process does not reflect a general didactic model" (Haas, 2005, p. 14; translation). Teachers, it is argued, do not just reproduce but work in an eclectic manner (cf. Zierer, 2009).

Furthermore, the conclusions reached by these authors are grounded on the basic assumption that all of the teachers included in the studies were familiar with didactic models (from their training). However, this is not necessarily the case, as revealed by a survey of more than 500 students at the University of Oldenburg. Around two-thirds of the participants in this survey stated that they were not familiar with didactic models (Didaktisches Zentrum, 2009). Consequently, it is not possible to draw conclusions on the use and the practicality of models until it is clear whether teachers are familiar with them at all.

In the recent research into the usability of didactic models (Ćatić, 2016; Wernke et al., 2015; Zierer & Wernke, 2013) the focus was primarily on the usability of the concrete models, not on teachers' lesson planning activities in the general sense. The qualitative study conducted by Zierer & Wernke (2013) brought certain methodological novelties in relation to the earlier research: (1) It attempted to exclude teachers' routine and previous experience, (2) it used an inductive path to obtain the usability categories, and (3) it subjected didactic models to direct empirical testing. The results of this study diverge from the results of the earlier studies—didactic models are not generally useless, and the conclusion is that they could be improved by combining different models (Zierer & Wernke, 2013, pp. 158–159). On the basis of the usability categories obtained through qualitative study, the researchers developed a questionnaire with an assessment scale of the usability of didactic models. The scale items were constructed according to the categories and subcategories of the qualitative analysis and were joined theoretically to one of four subscales: *presentation*, *content*, *comprehensiveness*, and *relatedness to practice*. After the pilot application of the questionnaire on the sample of students of teaching-oriented studies ($N = 98$), the main study (Wernke et

**Table 1.** Description of the overall sample of participants regarding gender and average age.

| | Gender | | | |
|---|---|---|---|---|
| Subsample | f | m | Total | Average age |
| Students | 125 (41.94%) | 25 (8.38%) | 150 (50.33%) | 23.04 |
| Teachers | 129 (43.28%) | 19 (6.38%) | 148 (49.66%) | 42.75 |
| Total | 254 (85.23%) | 44 (14.77%) | 298 (100%) | 32.83 |

al., 2015) was conducted. The results of this study are presented in a separate section (*Comparison of Croatian and German results regarding the usability of didactic models*). The results of the preliminary study into the usability of didactic models on the Croatian sample of respondents (Ćatić, 2016) are presented below, along with the results of the main study on the Croatian sample.

## Research methodology

### *Aim and research considerations*

Considering the fact that didactics has been challenged within the standardization of education, the aim of this article is to examine the validity of the argument concerning the uselessness of didactical models. This supports the idea of general didactics being in an unfavourable position. To this end, we conducted an empirical study into the usability of didactic models of lesson planning on a Croatian sample[4] and compared it with the results obtained in previous research in Germany (Wernke et al., 2015). The term *usability* means the advantages of theory in practice (Zierer & Wernke, 2013).

Starting from the aim of the study mentioned above, we formulated the following initial research considerations:

(1) Didactic models are useless.
(2) Didactic models are different in terms of their usability.
(3) Participants' (duration of) work experience is not related to how they rate the usability of didactic models.

### *Methods and sample*

The empirical study was conducted in 2015 (April and May) on a sample of 298 participants, 150 of them final year students of teacher education and teaching-oriented studies at the Juraj Dobrila University of Pula and the other 148 teachers of lower and upper primary school grades at 9 schools in the city of Pula. Table 1 shows that female students ($N = 125$ or 83.33%) represent the majority of the total number of students ($N = 150$) as well as that female teachers ($N = 129$ or 87.16%) represent the majority of the total number of teachers ($N = 148$). The average age of the students was 23.04 years, ranging from 21 to 55 years.[5] The average age of teachers was 42.75 years; the youngest teacher was 25 and the oldest teacher was 64.

### *Research instrument*

In the empirical study, we used a modified questionnaire originally developed by Wernke et al. (2015) for studying the usability of didactic models in lesson planning on a German

sample within the project "Entwicklung und Evaluation von Planungsmodellen der Allgemeinen Didaktik—EEPAD" (Development and evaluation of models in lesson planning in general didactics). The questionnaire consisted of three parts, each of them designed to evaluate the usability of a single didactic model—Klafki's Perspective Schema Model, Heimann's Berlin Model, and Schulz's Hamburg Model. In each part of the questionnaire, the respondents were asked to study one of the three theoretical models, explained via a graphical representation (with original illustrations made by the author of the model) and a short text, and to imagine planning any lesson using the respective model. The respondents then rated the extent to which they agreed with the claims ($N = 17$) concerning the usability of didactic models. The rating was based on a five-point Likert scale from *1*, *I strongly disagree*, to *5*, *I strongly agree*. According to the preliminary study on the Croatian sample (Ćatić, 2016), each claim (in total 17) belongs to one of the four factors representing the four categories of usability of didactic models (*presentation*, *content*, *comprehensiveness* and *relatedness to practice*).

Since the overall results of the preliminary study were published in a separate article (Ibid) and presented along with the results of the main study (*Research results* section), we only highlight important data related to the questionnaire adaptation in this section. Additionally, we also checked the procedure for testing the factor structure of the scale that was used to rate didactic models. The questionnaire was adapted in accordance with the research aim and hypotheses as well as the linguistic and educational characteristics and specificities of the Croatian respondents. The textual clarifications added to the original model illustrations represent a difference when compared to the original instrument, which included only the graphical representation. Furthermore, the original study included the three classical models of general didactics and the rating of usability of the more recent eclectic model (Zierer & Seel, 2012), which was omitted in the Croatian study, in line with the research aim and hypotheses.

Since it was the first time a foreign language instrument had been used on the Croatian sample (students in the final years of teacher education and teaching-oriented studies, $N = 110$), it was necessary to check whether the factor structure of the questionnaire matched with the original factor structure. The original assessment scale contained 20 items belonging to one of the four factors *presentation*, *content*, *comprehensiveness* and *relatedness to practice*. The factor analysis of the usability of didactic models scale was conducted on the Perspective Schema Model.[6] We also conducted a confirmatory factor analysis with the ML (maximum likelihood) method of extraction of factors and default settings of the LISREL 8.8 programme. With regard to our definition of the parameters, which we estimated according to the theoretical model (the original pattern of interrelatedness between the twenty items and the theoretical factor is presented in Table 2), standard settings enabled the factors to correlate, the covariance of measurement errors were fixed to zero, and the variance of the latent variables were fixed to one. Measurement errors were represented with the unique factors, which set the scale by fixing the factor saturation to one.

With regard to the results of the factor analysis, it can be summarized that, in the first calculation on the Croatian sample, the factor structure matching indicators exceeded the agreed limits, meaning that there was no matching of the factor structure with the structure determined by the original authors ($\chi^2 = 336.61$, $df = 164$, $\chi^2/df = 2.0525$; $RMSEA = 0.11$, $CFI = 0.92$). We then changed the original scale structure by omitting the three items with the highest modification indices (Klafki14 from the *presentation* subscale and Klafki8 and

**Table 2.** Presentation of free (1–20) and fixed (0) parameters of factor saturation according to the original model.

| | Factors—categories of usability of didactic models | | | |
|---|---|---|---|---|
| *I personally consider the planning model to be…* | Presentation | Content | Comprehensiveness | Relatedness to practice |
| Klafki03 ... *presented in an optically attractive way.* | **1** | 0 | 0 | 0 |
| Klafki11 ... *presented transparently.* | **2** | 0 | 0 | 0 |
| Klafki14 ... *presented as appropriately complex and multilayered, as it presents only what is necessary and as little as possible.* | **3** | 0 | 0 | 0 |
| Klafki15 ... *presented purposefully, because the presentation supports transparency.* | **4** | 0 | 0 | 0 |
| Klafki20 ... *presented in a clearly structured way.* | **5** | 0 | 0 | 0 |
| Klafki04 ... *sufficiently differentiated in content, because it contains important sub-items/aspects.* | 0 | **6** | 0 | 0 |
| Klafki05 ... *theoretically credible.* | 0 | **7** | 0 | 0 |
| Klafki06 ... *sufficiently developed in content.* | 0 | **8** | 0 | 0 |
| Klafki07 ... *theoretically founded.* | 0 | **9** | 0 | 0 |
| Klafki09 ... *theoretically meaningful.* | 0 | **10** | 0 | 0 |
| Klafki01 ... *understandable in content.* | 0 | 0 | **11** | 0 |
| Klafki02 ...*without contradictions.* | 0 | 0 | **12** | 0 |
| Klafki08 ... *sufficient regarding clarifications and explanations.* | 0 | 0 | **13** | 0 |
| Klafki16 … *easily understandable as a whole.* | 0 | 0 | **14** | 0 |
| Klafki17 ... *self-clarifying.* | 0 | 0 | **15** | 0 |
| Klafki18 … *appropriate regarding the selection of concepts, because proper concepts are selected.* | 0 | 0 | **16** | 0 |
| Klafki19 ... *understandable regarding the choice of terms, because I understand the meaning of the terms used.* | 0 | 0 | **17** | 0 |
| Klafki10 ... *completely feasible.* | 0 | 0 | 0 | **18** |
| Klafki12 ... *flexibly applicable for concrete lesson planning.* | 0 | 0 | 0 | **19** |
| Klafki13 ... *useful for concrete lesson planning.* | 0 | 0 | 0 | **20** |

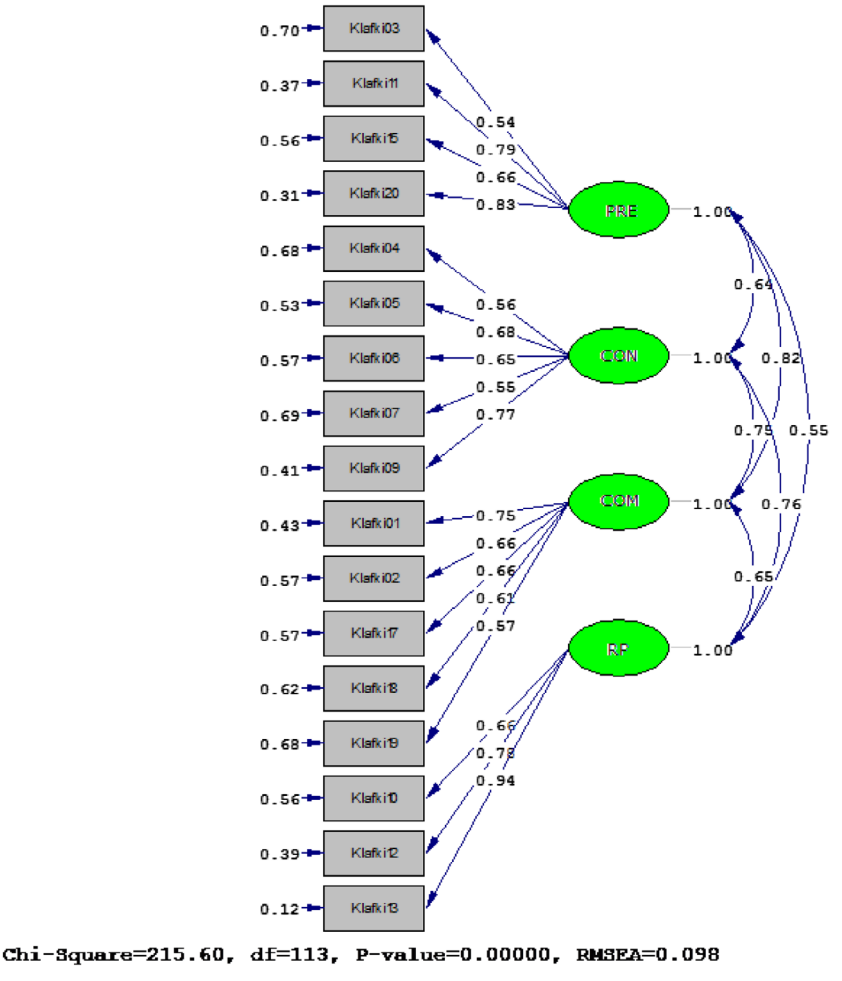


**Figure 1.** Factor structure of the *Perspective Schema* model rating.
Explanation of abbreviations: PRE = Presentation, CON = Content, COM = Comprehensiveness, RP = Relatedness to practice.

Klafki16 from the *comprehensiveness* subscale) (Table 2). In this way, a satisfactory (albeit marginal) degree of matching between the original and the modified factor structure was achieved ($\chi^2 = 215.60$, df = 113, $\chi^2$/df = 1.9079, RMSE = 0.098, CFI = 0.94). The analysis showed that the factor structure with four factors has the best matching indicators, with items Klafki 03, 11, 15 and 20 being the manifests of the factor *presentation*, items Klafki 04, 05, 06, 07 and 09 being the manifests of the factor *content*, items Klafki 01, 02, 17, 18 and 19 being the manifests of the factor *comprehensiveness*, and items Klafki 10, 12 and 13 being the manifests of the factor *relatedness to practice* (Figure 1).

Table 3 presents the correlation matrix of latent variables, which indicates a high positive correlation between all variables, with the highest correlation (even 0.82) between the factors *presentation* and *comprehensiveness*, which is almost unacceptable in terms of the discriminative validity of retained factors.

Regardless of the marginal values obtained in these calculations, we concluded that the pilot use of the modified questionnaire on the Croatian sample was justified and that it thus

**Table 3.** Matrix of correlations regarding latent variables.

| | Presentation | Content | Comprehensiveness | Relatedness to practice |
|---|---|---|---|---|
| Presentation | 1.00 | | | |
| Content | 0.64 | 1.00 | | |
| Comprehensiveness | 0.82 | 0.75 | 1.00 | |
| Relatedness to practice | 0.55 | 0.76 | 0.65 | 1.00 |

**Table 4.** Results of the subscale reliability test.

| | *Perspective Schema* Model | Berlin Model | Hamburg Model |
|---|---|---|---|
| Subscale | $\alpha$ | $\alpha$ | $\alpha$ |
| Presentation | 0.867 | 0.882 | 0.890 |
| Content | 0.862 | 0.876 | 0.910 |
| Comprehensiveness | 0.825 | 0.859 | 0.875 |
| Relatedness to practice | 0.840 | 0.797 | 0.870 |

represents a suitable measuring instrument that can be applied on larger samples in the subsequent studies.

## Research results

In the main study, the participants rated the usability of didactic models on four subscales representing the categories of their usability (five-point Likert scale). Since the mean value of such a scale is 2.5, all values above 3 were interpreted as positive (Wernke et al., 2015).

### *Reliability of subscales*

We performed calculations to determine the reliability of the subscales (*presentation*, *content*, *comprehensiveness* and *relatedness to practice*) for each individual model. As seen in Table 4, the subscale descriptive analysis indicated that all of the subscales recorded acceptable reliability coefficients (Cronbach's $\alpha$). In the German study, we also carried out the calculations of reliability of subscales individually for each model. They were also good to very good, with the lowest value at $\alpha = .74$ (Wernke et al., 2015).

### *Usability of individual models*

#### *"Perspective Schema" Model*

This model was rated with means above 3 in each subscale. Hence, it was rated positively overall (Figure 2). The *content* ($M = 3.49$) subscale was ranked the highest. The rating of the *presentation* ($M = 3.39$) subscale was slightly lower but still positive, while the *relatedness to practice* ($M = 3.27$) and *comprehensiveness* ($M = 3.22$) subscales turned out to be the weakest in Klafki's model. Thus, they can be claimed to be the weakest points of the entire model. The participants experienced the *Perspective Schema* Model as entirely content-reliable and well presented, while their ratings regarding its relatedness to practice and comprehensiveness were more neutral. Thus, these last two subscales represent aspects that should be enhanced. In the preliminary study (Ćatić, 2016), the *Perspective Schema* Model was rated even slightly worse on three subscales (*presentation*, *content*, and *relatedness to practice*),

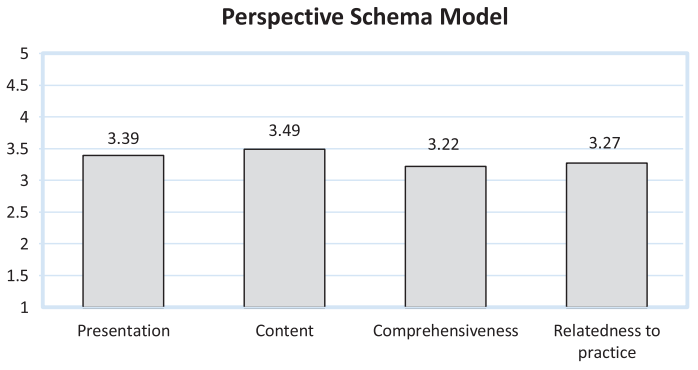


**Figure 2.** Mean subscale values for the *Perspective Schema* Model.

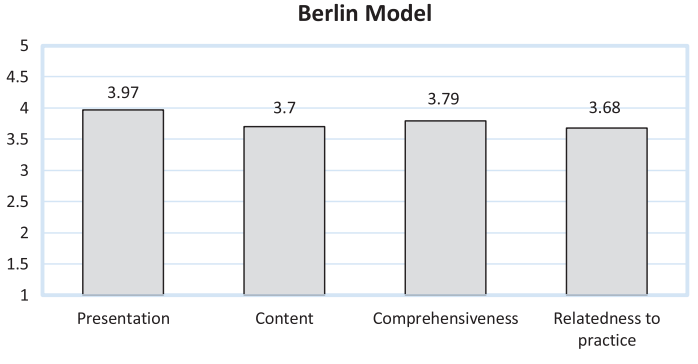


**Figure 3.** Subscale mean values for the Berlin Model.

but these differences were discrete. Therefore, this particular model was similarly rated in both studies, all in all positively, having subscale means from $M = 3$ to $M = 3.5$.

### *Berlin Model*

In the main study this model had mean values (each subscale) above 3.5 (Figure 3). The highest values were recorded in *presentation* ($M = 3.97$), followed by *comprehensiveness* ($M = 3.79$) and *content* ($M = 3.70$). The lowest value was reported in *relatedness to practice* ($M = 3.57$), which can be interpreted as the weakest point of the model according to the participants in this study, although the rating was high. Taking into account the high values achieved by this planning model in each subscale, it may be concluded that the participants experienced it as completely usable, that is, well-presented, comprehensive, reliable in terms of content, and related to practice. Very similar results for the Berlin Model were obtained in the preliminary study (Ćatić, 2016). Thus, the same claim can be made for the Croatian participants.

### *Hamburg Model*

Compared to the previous ones, this model showed the lowest mean values in each subscale and overall in the Croatian study. Two subscales achieved negative ratings: *presentation* ($M = 2.84$) and *comprehensiveness* ($M = 2.98$); hence, it may be concluded that the participants

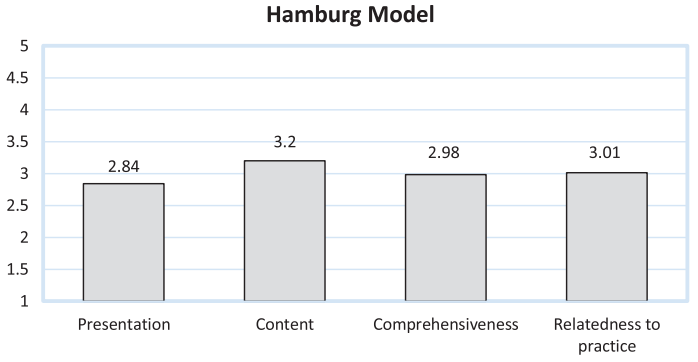


**Figure 4.** Subscale mean values for the Hamburg Model.

experienced the Hamburg Model as badly presented and difficult to comprehend (Figure 4). The *relatedness to practice* subscale was rated as neutral ($M = 3.01$), while the *content* subscale was rated positively ($M = 3.20$), thus presenting the strongest point of this model. Considering the fact that two of the subscales had negative ratings, one had a neutral rating, and the highest rating was only $M = 3.20$, this was the only model that may be labelled as *non-usable* overall according to the participants, and this is also supported by the results obtained in the preliminary study (Ćatić, 2016).

Our results may lead to the conclusion that our first research consideration*, according to which didactic models are not usable, has been confirmed only for the Hamburg Model*, which was rated negatively in two subscales and had the lowest values in each subscale in comparison with the other two models. The *Perspective Schema* Model and the Berlin Model were rated positively overall, with the Berlin Model being the most usable as all of the values were above 3.5. The rating of the *Perspective Schema* Model was a bit more moderate but positive. Therefore, we can conclude that, *generally speaking, the non-usability of didactic models has not been empirically confirmed in this study.*

## *Didactic models in comparison*

In order to determine the significance of differences in the ratings between the models included in this study, that is, whether the arithmetic means of the subscales differ between different models, we conducted one-way analyses of variance with the Bonferroni correction for multiple post-hoc comparisons. Table 5 shows that all differences in the arithmetic means on the usability subscales between the models are statistically significant, meaning that the respondents rated each model in each subscale with significant differences. For example, taking the subscale of *presentation,* it would mean that the Berlin Model was rated significantly better than the *Perspective Schema* Model and the Hamburg Model. In addition, taking the subscale of *comprehensiveness,* it would mean that the Hamburg model was rated significantly worse than the *Perspective Schema* Model and the Berlin Model, etc.

When each rating of didactic models in the main study (Figure 5) is compared, it is noticeable that the Berlin Model was unequivocally rated the best, with each mean value above 3.5. It achieved the best ratings on all four subscales. Its strongest point was *presentation* ($M = 3.97$), while its weakest point was *relatedness to practice* ($M = 3.68$). The *Perspective*

**Table 5.** Mean values and statistical significance of differences among the models with the Bonferroni correction for multiple post-hoc comparisons.

| | *A Perspective Schema* Model | | *B* Berlin Model | | *C* Hamburg Model | | | |
|---|---|---|---|---|---|---|---|---|
| Subscale | *M* | SD | *M* | SD | *M* | SD | *F* | df |
| Presentation | 3.39b,c | 0.89 | 3.97a,c | 0.78 | 2.84a,b | 0.99 | 118.221** | 2.891 |
| Content | 3.49b,c | 0.76 | 3.70a,c | 0.71 | 3.20a,b | 0.81 | 32.031** | 2.891 |
| Comprehensiveness | 3.22 b,c | 0.74 | 3.79a,c | 0.68 | 2.98a,b | 0.83 | 92.089** | 2.891 |
| Relatedness to practice | 3.27b,c | 0.83 | 3.68a,c | 0.77 | 3.01a,b | 0.85 | 50.730** | 2.891 |

Notes: Subscripts (a, b and c) indicate the groups with significantly different mean values with the Bonferroni correction for multiple comparisons.
**$p < 0.01$.

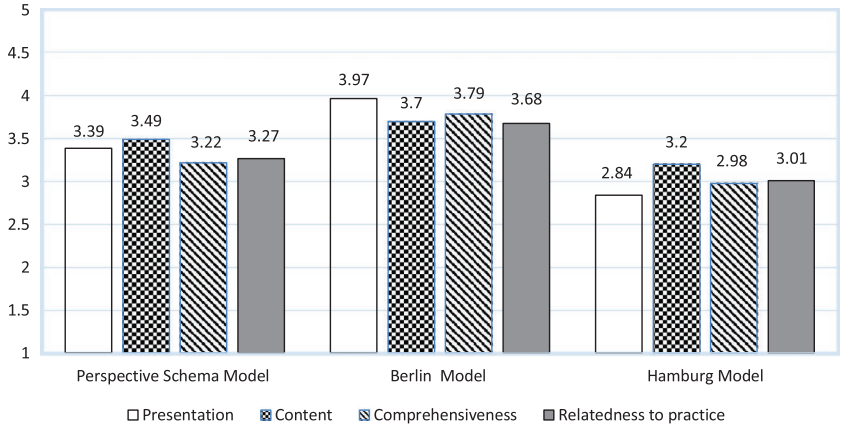


**Figure 5.** Mean values of the subscale usability of the three models.

*Schema* Model achieved slightly worse ratings, although its overall rating was positive. Its strongest point was *content* ($M = 3.49$), while the weakest one was *comprehensiveness* ($M = 3.22$). The lowest values were recorded in the Hamburg Model. Each subscale had the lowest values, while two subscales had negative ratings. Its strongest point was *content* ($M = 3.20$), though it should be noted that even this value was the lowest of the three didactic models on this subscale, and its weakest point was *presentation* ($M = 2.84$). If one considers the comparative results obtained in the preliminary study (Ćatić, 2016)—in which the Berlin Model was definitely rated the best, followed by the *Perspective Schema* Model with a slightly lower but positive ranking and the Hamburg Model, which was seen as non-usable—, the results were confirmed in this study, despite minor differences in the ratings of some subscales.

With regard to the results obtained here, it may be concluded that the *second research consideration, according to which there are no differences between didactic models in terms of their usability, has not been confirmed: The differences in evaluating the categories of usability of didactic models were statistically significant.*

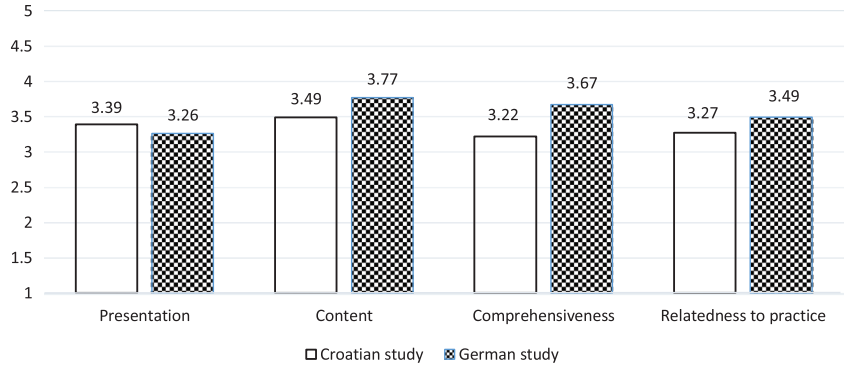


**Figure 6.** Mean subscale values for the *Perspective Schema* Model in Croatia and Germany.

### *Relation between the rated usability of didactic models and participants' work experience*

In order to determine whether the participants, according to the period they were teaching, showed different results across the subscales, that is, categories of the usability of models, we conducted one-way analyses of variance. They were grouped into three categories according to their work experience: students, younger teachers (up to 15 years of teaching experience), and older teachers (16 years of teaching experience and more). The rating results showed that there was no statistically significant difference regarding the model ratings, which may lead to the conclusion that in the Croatian sample, work experience was not related to the rated usability of didactic models. In case of the *Perspective Schema* Model, this means that no significant difference was obtained among the three responding subgroups in the areas of *presentation* ($F = 2.164$, df = 2.295; $p = 0.117$), *content* ($F = 1.399$, df = 2.295; $p = 0.249$), *comprehensiveness* ($F = 238$, df = 2.295; $p = 0.789$), and *relatedness to practice* ($F = 703$, df = 2.295; $p = 0.496$).

On the basis of the results regarding the correlation between the rated usability of models and the participants' work experience, we conclude that the third research consideration, according to which the participants' work experience is not related to their ratings concerning the usability of models, has been confirmed.

## Comparison of Croatian and German results regarding the usability of didactic models

### *Usability of individual models*

#### *Perspective Schema Model*

Overall, in the study conducted in Germany (Wernke et al., 2015), the *Perspective Schema* Model was positively rated (Figure 6). This model was rated even better in three subscales when compared with the Croatian study (*content*: $M = 3.77$; *comprehensiveness*: $M = 3.67$ and *relatedness to practice*: $M = 3.49$). Only the *presentation* subscale was rated slightly worse ($M = 3.26$) than in the Croatian studies and represents the model's weakest point according to the German participants.

**Table 6.** Statistical significance of differences in the rating of the *Perspective Schema* Model between the Croatian and German respondents.

| Subscale | Country | *N* | *M* | SD | SEM | *t* | *p* |
|---|---|---|---|---|---|---|---|
| Presentation | Croatia | 298 | 3.3960 | 0.89193 | 0.05167 | 1.792 | 0.074 |
| | Germany | 316 | 3.2627 | 0.94774 | 0.05331 | | |
| Content | Croatia | 298 | 3.4946 | 0.76438 | 0.04428 | −4.491** | 0.000 |
| | Germany | 315 | 3.7675 | 0.73953 | 0.04167 | | |
| Comprehensiveness | Croatia | 298 | 3.2188 | 0.73758 | 0.04273 | −7.084** | 0.000 |
| | Germany | 316 | 3.6661 | 0.82162 | 0.04622 | | |
| Relatedness to practice | Croatia | 298 | 3.2685 | 0.83254 | 0.04823 | −3.224** | 0.001 |
| | Germany | 315 | 3.4989 | 0.93139 | 0.05248 | | |

*$p < 0.05$;
**$p < 0.01$.

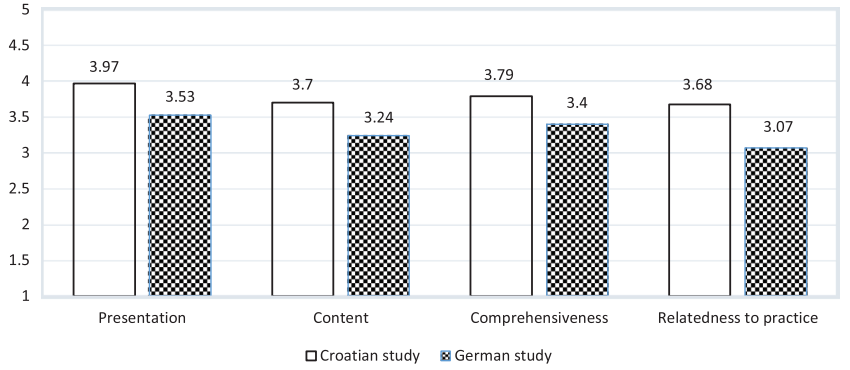


**Figure 7.** Subscale mean values for the Berlin Model in Croatia and Germany.

In order to determine a statistical significance of differences in the ratings of the *Perspective Schema* Model between the Croatian and German studies, that is, whether the arithmetic means of subscales of usability differ between the Croatian and German respondents, we conducted independent samples *t*-tests. As seen in Table 6, the differences in arithmetic means between the Croatian and German studies are statistically significant for three out of four subscales of usability. In particular, the Croatian and German respondents did not show statistically significant differences in their ratings of the subscale *presentation,* while there were statistically significant differences for the other three subscales (*content*, *comprehensiveness* and *relatedness to practice*). Given these differences, it may be concluded that the German participants estimated Klafki's model to be more reliable in terms of content, comprehensiveness, and degree of relativity to practice than the Croatian participants, although both samples rated the model positively as a whole.

### *Berlin Model*

In the German study (Wernke et al., 2015), the Berlin Model was also rated positively on each subscale (Figure 7). Interestingly, the order of the subscales from the one with the highest value to the one with the lowest value is equal to the studies on the Croatian sample, but each of these values is lower in the German study (*presentation*: $M = 3.53$; *comprehensiveness*: $M = 3.40$; *content*: $M = 3.24$; and *relatedness to practice*: $M = 3.07$).

**Table 7.** Statistical significance of differences in the rating of the Berlin Model between the Croatian and German respondents.

| Subscale | Country | *N* | *M* | SD | SEM | *t* | *p* |
|---|---|---|---|---|---|---|---|
| Presentation | Croatia | 298 | 3.9757 | 0.78418 | 0.04543 | 7.239** | 0.000 |
| | Germany | 350 | 3.5316 | 0.77313 | 0.04133 | | |
| Content | Croatia | 298 | 3.6993 | 0.71487 | 0.04141 | 8.281** | 0.000 |
| | Germany | 350 | 3.2407 | 0.69209 | 0.03699 | | |
| Comprehensiveness | Croatia | 298 | 3.7906 | 0.68415 | 0.03963 | 6.942** | 0.000 |
| | Germany | 351 | 3.3966 | 0.74995 | 0.04003 | | |
| Relatedness to practice | Croatia | 298 | 3.6779 | 0.76923 | 0.04456 | 9.358** | 0.000 |
| | Germany | 349 | 3.0669 | 0.87464 | 0.04682 | | |

*$p < 0.05$;
**$p < 0.01$.

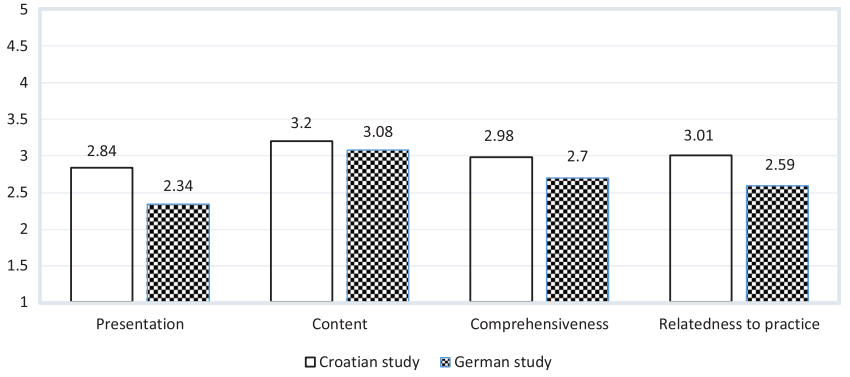


**Figure 8.** Subscale mean values for the Hamburg Model in Croatia and Germany.

In order to determine the statistical significance of differences in evaluating the Berlin Model between the Croatian and German studies, that is, whether the arithmetic means of the usability differ between the Croatian and German respondents, we conducted independent samples *t*-tests. As shown in Table 7, all of the differences in the arithmetic means between the Croatian and German studies are statistically significant. Given these differences, it may be concluded that the Croatian respondents rated the Berlin Model significantly better than the German respondents (although their ratings are also positive as a whole).

### *Hamburg Model*

In the German study (Wernke et al., 2015), the Hamburg Model also showed the lowest mean values in each subscale and overall. It is interesting to note that in the German study, this model was rated negatively in the same subscales as the Croatian preliminary study (*comprehensiveness*: $M = 2.70$; *relatedness to practice*: $M = 2.59$; and *presentation*: $M = 2.34$), and only the *content* ($M = 3.08$) subscale was rated as neutral (Figure 8). However, it can be noted that the German respondents were more critical about this model than the Croatian respondents.

In order to determine statistically significant differences in evaluating the Hamburg Model between the Croatian and German studies, that is, whether the arithmetic means of the usability subscales differ between the Croatian and German respondents, we conducted

**Table 8.** Statistical significance of differences in the rating of the Hamburg Model between the Croatian and German respondents.

| Subscale | Country | *N* | *M* | SD | SEM | *t* | *p* |
|---|---|---|---|---|---|---|---|
| Presentation | Croatia | 298 | 2.8414 | 0.99907 | 0.05787 | 6.780** | 0.000 |
| | Germany | 330 | 2.3394 | 0.85589 | 0.04712 | | |
| Content | Croatia | 298 | 3.2007 | 0.80979 | 0.04691 | 2.010* | 0.045 |
| | Germany | 328 | 3.0754 | 0.74918 | 0.04137 | | |
| Comprehensiveness | Croatia | 298 | 2.9792 | 0.82583 | 0.04784 | 4.232** | 0.000 |
| | Germany | 330 | 2.7040 | 0.80268 | 0.04419 | | |
| Relatedness to practice | Croatia | 298 | 3.0101 | 0.85296 | 0.04941 | 5.975** | 0.000 |
| | Germany | 327 | 2.5933 | 0.88715 | 0.04906 | | |

*$p < 0.05$;
**$p < 0.01$.

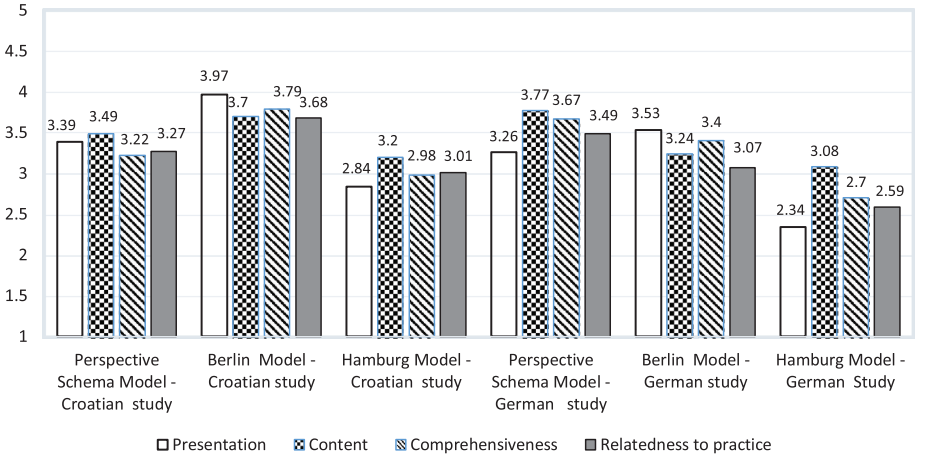


**Figure 9.** Mean values of the usability subscale of the three models in Croatia and Germany.

independent samples *t*-tests. As shown in Table 8, all of the differences in the arithmetic means between the Croatian and German studies are statistically significant. Given these differences, it may be concluded that the Croatian respondents rated the Hamburg Model significantly better than the German respondents. Despite this finding, both samples agree on the usability of the Hamburg Model, which is the only model rated overall as *non-usable* in both studies.

## *Didactic models in comparison*

To compare the overall results of the Croatian studies with the German ones (Wernke et al., 2015) (Figure 5), in which the highest usability rating was achieved by the *Perspective Schema* Model, followed by the Berlin Model, while the lowest values were recorded in the Hamburg Model, it may be concluded that the Croatian participants rated the Berlin Model best, then the *Perspective Schema* Model, while the German participants rated the *Perspective Schema* Model the best, followed by the Berlin Model. The Hamburg Model was ranked lowest by the Croatian and German participants (Figure 9).

We suspect that the participants of the two studies rated the usability of models differently primarily due to differences in their initial education. The assumption is that the participants preferred what they were most familiar with, that is, what they had encountered most often in their initial teacher education. Since Klafki's model, which belongs to the classical *human-science oriented* German tradition of didactics (ger. Geisteswissenschaftliche Didaktik), traditionally occupies the most important place in German teacher education (Arnold, 2012; Zierer & Seel, 2012), it is understandable that the German participants gave this particular model the best ratings. Although the factors influencing the Croatian didactics tradition (esp. in relation to teacher education) have not been studied in the literature, the results of our study clearly show that the Croatian participants preferred the Berlin Model, which belongs to the *empirical-analytical paradigm* in didactics. Their rating regarding the Hamburg Model also confirms that the Croatian participants had preferences for the empirical-analytical paradigm in education. Although they rated this model negatively, their rating was significantly better than that of the German participants.

### *Relation between the rated usability of didactic models and participants' work experience*

Unlike the Croatian study, the German study (Wernke et al., 2015) showed that some differences in the ratings across the participating sub-groups were statistically significant, which may lead to the conclusion that in the German study the length of work experience was related to the rated usability of models. To put it more precisely, one-way analysis of variance with post-hoc Scheffé tests showed significant differences in ratings between different groups of respondents in 10 out of 36 cases. In 5 cases, the differences were determined between students and teachers, and in another 5 cases the differences were found between students and teacher apprentices. No significant differences were found between teacher apprentices and teachers, which led the researchers to conclude that the length of practical experience plays a subordinate role in the rating of models once a certain amount of experiential knowledge (Ibid) has been acquired. On the *content* subscale, significant differences between students' ratings and at least one of the two other groups of respondents were recorded in all the models. On the *comprehensiveness* subscale, this is the case with two out of three models (*Perspective Schema* Model and Hamburg Model), and on the *relatedness to practice* subscale, this is also the case in two of three models (Berlin Model and Hamburg Model). On the *presentation* subscale, no significant difference between students' ratings and other groups of respondents' ratings were found, suggesting that the rating of models' *presentation* does not depend on the professional experience of respondents. On the basis of these results, the researchers concluded that the different subscales were subject to different strengths of influence of respondents' practical experience (Ibid).

The differences in the results across the groups, classified according to the participants' work experience in the German and Croatian studies, can again be found in their education. In Croatia, these models are almost completely unknown to students and teachers (Ćatić, 2016), and since both of them were encountering these models for the first time, they approached them equally, so the difference in their ratings is not statistically significant. However, the German participants showed better prior knowledge about the didactic models than their Croatian colleagues, though not to such an extent as would be expected. In particular, Zierer & Wernke (2013) and Wernke et al. (2015) interestingly claim that in a survey

of more than 500 students at the University of Oldenburg, a full two-thirds of the respondents stated that they were not familiar with the didactic models. Since the didactic models in question had been presented to the German students during their studies at least in part, they rated them better than their teachers. This is because models help students get their bearings when planning lessons, and they still need this help due to a lack of experience. Teachers do not need this help so much, because they already have a clearer picture and have automated their knowledge of what to take into account in lesson planning, that is, in practice they model their subjective means of lesson planning while still searching for the didactic models presented to them during their studies (Wernke et al., 2015).

## Discussion and conclusion

We already discussed issues relating to the content of the results in the previous section when comparing the results of the different models. For this reason, we will briefly make the link to the theoretical framework below in order to place the emphasis on methodological classification.

In the theoretical framework section, we discussed the differences between general didactics and the Anglo-Saxon traditions of curriculum and instruction. In doing so, we determined that it could be extremely profitable for these disciplines to take a look at the other discipline. In this respect, the study presented in this article attempts to connect the different focal points and contents of general didactics and the Anglo-Saxon curriculum and instruction tradition or to make them visible to each other by evaluating the German tradition of didactic models in an international framework and thus placing them in the focus of attention.

The results of the evaluations of the models show that they also fulfil their simplifying and pragmatic functions in an international context. This is particularly evident from the fact that the models can be attributed a general practicability, even in the case of differing theoretical discussions (as found here between German and Croatian students) and the different languages, although the assessments within the subscales are somewhat different from country to country. On the basis of these results, it may be concluded that the models are also useful in other language areas for practical lesson planning and pedagogical knowledge (Shulman) in the field of lesson planning. In this way, the didactic models can make a major contribution to the international connectivity of the discipline of general didactics. However, the summary of the results and the conclusions based on them must still be seen critically against the background of certain methodological limitations. This needs to be pointed out when it comes to the research and assessment of the quality of the presented results and conclusions.

It will first be necessary to mention potential limitations common to the studies in the German-speaking countries (Wernke et al., 2015; Zierer & Wernke, 2013), as well as to the preliminary study (Ćatić, 2016) conducted on the Croatian sample. We will also make suggestions for further research, as they result from these limitations. Then, we will consider some limitations that are specific to the research design along with possible comparisons to previous studies and also make suggestions for further research resulting from these limitations.

As in the previous German study and the preliminary study with the Croatian sample, the didactic models in our study were not tested in real use. Rather, the participants were asked to think and try to plan a lesson and then to subjectively rate the usability of didactic models.

A study of this type should be supplemented by a follow-up analysis of the lesson plans the participants drew up using the didactic models and an evaluation of the quality of teaching based on the use of the didactic planning models; in this way a subjective usability rating would be added to the objective quality rating, including the written lesson plans and teaching that remains for further research into didactic models (Wernke et al., 2015).

In addition, during testing in our study, didactic theories were reduced to graphical presentations (and concise clarifications), and this resulted in a reduction of the overall analysis. This is actually a common problem for the discourse of general didactics, since the knowledge of students, school teachers and even university teachers often comes from abridged presentations in general surveys, while elaborate original resources by the authors of didactic models are hardly ever read by anyone (Wernke et al., 2015).

The following argument deals with the specific design of the Croatian study, that it, a methodological move away from the previous research, which is a potential limitation when it comes to comparing their results. What makes this study different from the German studies is a textual explanation that accompanies an original illustration of each model. The decision to include short textual explanations can be supported by the opinion that a graph alone (an original illustration by the author of the theoretical model) is not enough for the participants to understand a model thoroughly, since these models are presented in Croatian didactics textbooks (also in syllabi) for university students only in part or not at all (Ćatić, 2016). Thus, they were almost completely unknown to the participants in the study (both the students and the teachers). Once again, this points to differences between the Croatian and German teachers in their initial education, which—as we assume—is also the basic reason for the Croatian and German researchers having obtained different results. This concerns not only the differences in the models the participants preferred but also the significant differences in how they rated the models depending on their work experience (confirmed by the German participants but not by the Croatian participants). For the purpose of clarifying whether the factors of the Croatian and German participants' initial teacher education are a potential reason why they rated the models differently, it is necessary to determine the factors influencing the Croatian didactic tradition. We know that Croatia has been generally influenced by different education traditions, from the German and Soviet traditions to the Anglo-Saxon tradition of curriculum and instruction. The impact of these traditions needs to be defined if we are to better understand the reasons that led to the differences above. This requires a special scientific expertise and also represents a recommendation for further research. One idea for such research is to determine the elements of different educational traditions in the Croatian didactics textbooks for university students from a historical perspective. This would not only enable us to obtain answers to the question of why the Croatian and German participants rated the didactic models differently; in addition, efforts to attain a better awareness of the impact of existing traditions (primarily the European didactics tradition and the Anglo-Saxon tradition of curriculum and instruction in the context of the current global and reform changes marked by the curriculum that is oriented towards the development of competencies) would also open a path to the recognition and nurturing of the Croatian education tradition. This is a very sophisticated and demanding task, since foreign influences are normally seen as very complex and contradictory. Countries with influences stemming from different traditions are somewhat autonomous with regard to dominant cultures, and this is definitely what enables them to become aware of potential

advantages and disadvantages and to see them, as they may be neglected by the true successors of the two traditions (Mikser, 2005).

At first sight, the difference in the formation of sub-samples for testing the significance of differences between the respondents' ratings in relation to their work experience may seem to be a potential limitation with regard to comparing the Croatian and German results. In the Croatian study, the respondents were divided into students ($N = 150$), younger teachers (up to 15 years of teaching experience) ($N = 86$), and older teachers (16 years of teaching experience and above) ($N = 62$), while in the German study, the sub-samples consisted of students ($N = 188$), teacher apprentices ($N = 66$), and teachers ($N = 97$). The reason for this difference lies in the fact that Croatian schools take on a much smaller number of apprentices at one time than German schools, which is a result of differences in the way the two countries organize and implement teacher apprenticeship. A study conducted by Prgomet (2015) shows that in contrast to the initial primary teacher education in Germany, where apprenticeship represents the second phase of initial teacher education, this formal character of apprenticeship was not found in the Croatian pedagogical documentation. Furthermore, in Germany, teacher apprenticeship lasts between 18 and 24 months (depending on the state), while in Croatia the apprenticeship of primary and secondary teachers lasts only one year. However, the German study did not reveal a statistically significant difference in model ratings between apprentices and teachers but only determined differences between students and apprentices, students and teachers, it may be concluded that the difference in the formation of sub-samples does not represent a limitation for comparison of Croatian and German results. This is supported by the fact that, as far as the number of respondents in each sub-sample is concerned, there is one larger sub-sample (students) and two smaller sub-samples (two groups of teachers) in both studies.

On the basis of the results obtained in this study, it may be concluded that didactic models are not generally unusable and are different according to their usability. Although the size and the sampling method (non-representative—purposive and convenience sample) does not allow us to generalize the results to Croatia as a whole, they support the argumentation (Wernke et al., 2015; Zierer & Wernke, 2013) that questions the prevailing opinion in contemporary publications that didactic models are not close to practice and are not usable.

Moreover, since Croatia is a country that belongs to the European didactic tradition but has also been under the influence of other educational traditions, these results open the path for further research on the usability of didactic models in the international context and also challenge the call for successors to or an empirical turn of general didactics within the discussion on the identity, the scientific status and the future of general didactics.

## Notes

1. Künzli (2000) points out that the adjective *German* is used to indicate the linguistic and cultural area, and has no intention of referring to the geographical entity, especially not to any particular nation or country; therefore, the concept of the German didactics relates to past and present contributions in the context of more or less explicit educational tradition in the German-speaking countries.
2. The current global reform process regarding the standardization of education is promoted by the international education policy (influenced by the activities of organizations, such as the OECD, the World Bank, the European Union) and supported by the international tests of learner knowledge (e.g. TIMMS and PISA). Thus, it is becoming a common feature of the

management of educational systems in developed countries (Palekčić, 2006, 2007a, 2007b; Šoljan, 2007). Educational standards represent an instrument for managing school systems oriented to output (learning outcomes) as opposed to the traditional concept of input (oriented to programmes or contents) (Bašić, 2007a, 2007b; Jurčić, 2012; Lersch, 2005; Palekčić, 2005, 2009; Previšić, 2007a; Šoljan, 2007; Wacker, Rohlfs, & Kramer, 2013; Wacker & Strobel-Eisele, 2013), which is characteristic of the European tradition of didactics. Educational standards are learning outcomes in the form of competencies that all students at a particular educational level should achieve, which is examined by external evaluation (esp. international tests of learner knowledge) and strongly supported by the international education policy (Meyer, 2005; Palekčić, 2005; Terhart, 2005).

3. The German didactics tradition is based on the German term „Bildung", which is difficult to translate in English. Hudson (2007) dealed with that problem and described „Bildung" as „an elusive concept to capture in English". It has variously been translated as 'formation', 'education' and 'erudition'(...).Westbury (2000) suggests that 'formation' is the best English translation to capture the German sense of the term. In its turn, Bildung can be seen to be a state of being that can be characterized by a cluster of attributes described by terms such as 'educated', 'knowledgeable', 'learned', 'literary', 'philosophical', 'scholarly', and 'wise'." (p. 136) For better understanding, we use the common term of education instead of Bildung, but always keep in mind the considerations of Hudson and Westbury.
4. This research was conducted within the writing of the unpublished doctoral thesis titled *The usability of didactic models in the standardization of education*, defended in 2017 at the University of Zagreb, Faculty of Humanities and Social Sciences, Croatia (Matanović, 2017).
5. It should be noted that the majority of students ($N$ = 113 or 75.33%) was between 21 and 23 years old. However, 35 or 23.33% of students was between 24 and 29 years old, while 2 students were aged 39 and 55, which shifted their average age to higher values, but does not necessarily reflect the real situation regarding the age of this sub-sample. Given the fact that none of the *older* students had previous experience in teaching, we decided to include their evaluations of models in the analysis.
6. This decision was made for the purpose of comparing our results with the results of the original study, due to the fact that the authors of the original scale also conducted a factor analysis on the Perspective Schema Model (Ćatić, 2016).

## Disclosure statement

No potential conflict of interest was reported by the authors.

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