Teacher Perspectives on Whole-Task Information Literacy Instruction

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Abstract. This paper presents results of an explorative study on perceived merits of contemporary holistic approaches to designing information literacy instruction in a university setting. Seven teachers in educational sciences evaluated their premaster's course on conducting a literature review designed according to a modern design approach, named Four-Component Instructional Design (4C/ID). They noted their perceptions on course quality by means of a standardized course evaluation questionnaire and a SWOT analysis. Results of the questionnaire showed that teachers were positive on whole-task information literacy instruction, confirming the results of an earlier study on 4C/ID-caused instructional effects. The SWOT analysis indicated that teachers recognized the value of applied 4C/ID principles like whole-task-centeredness, structured guidance, and scaffolding. We added suggestions on enhancing the positive effects of whole-task instructional design based on identified educational weaknesses such as relatively poor constructive alignment and threats such as imperfect curriculum coherence.

Keywords: Information literacy · Instructional design · Whole-task models · 4C/ID-model · University teachers

1 Introduction

Contemporary approaches to the design of instruction for complex skills learning aim at developing sequences of whole, authenticity-based learning tasks [1–3]. The rationale behind this view on instructional design says that transfer of learning is enhanced when constituents of a complex skill (i.e., the underlying skills, knowledge, and attitudes) are learned in conjunction with each other. As such, the instruction handles persistent educational problems like compartmentalization of instructional materials, fragmentation of learning, and the transfer paradox [4]. Problems like these have been recognized in higher information literacy (IL) education but, as of yet, have not resulted in large-scale implementations of well-integrated whole task-centered instruction in curricula [5]. Although coherent IL-programs emerge [6, 7], it is still the compartmentalized, fragmented 'one-shot' IL-instruction that dominates the university learning landscape [5]. Past research shows that students benefit from whole task-centered instruction [8–10]. However, this research and ensuing good practice mainly stems from domains other

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than IL such as statistics education [11], science education [12], and medical education [13]. In order to validate findings from other disciplines, we initiated a research project in the domain of university IL-instruction. In that project we explored the effects of the whole task approach on learning how to conduct a literature review, a central IL-skill in academia.

We developed an IL-course (see [15], for a blueprint of the course) following the Four-Component Instructional Design (4C/ID) model of Van Merriënboer [4, 14], one of the most praised models for designing whole-task instruction [3]. An earlier study showed that the new 4C/ID-based course was effective as all students passed it [15]. Besides, students rated highly course features like whole learning tasks, guidance, and feedback, all indicators of good quality. However, we questioned the efficiency of the course as time on task was relatively high. The present study builds on these findings and analyses in-depth course characteristics that might affect course effectivity and efficiency. In order to triangulate findings presented in the previous study [15], we decided to focus on the teachers' perspectives on course quality. Since teachers are pivotal in the educational process, we expected them to provide unique insight in the nature and quality of the whole-task instruction they delivered [16].

We used a standard course evaluation questionnaire from the Open University of the Netherlands [17] to measure the teachers' views on course quality (i.e., studiability, feasibility, and practicability) as stated in Research Question (RQ) 1. Questions focused on (perceived) quality of course constituents, instructional guidance, and instructional support. Instruments like these are frequently used for research purposes [15]. Since we used the same instrument to measure students' perceptions on course quality in the earlier study, it was possible to compare students' and teachers' views as stated in Research Question (RQ) 2. This comparison is of value for instructional designers as it contrasts perceptions of 'consumers' (i.e., students) and 'producers' (i.e., teachers) of whole-task instruction, two important groups of actors in the educational process [18]. In addition, it contributes to a comprehensive 360 degree overview of course quality aspects. We added an analysis of strengths, weaknesses, opportunities, and threats (SWOT), as stated in Research Question (RQ) 3 to analyze the course quality aspects in depth. This type of analysis is increasingly used in education to systematically explore various constituents of instructional quality and to provide information for quality improvement [19, 20].

In sum, our study aimed to reveal teacher perceptions on the quality of whole task-centered IL-instruction. We compared findings with a previous study on student perceptions and scrutinized strengths, weaknesses, opportunities, and threats of the IL-course by means of a SWOT-analysis. The research questions were as follows:

- RQ1: How do teachers perceive the quality of whole task-centered instruction?
- RQ2: Does perceived quality differ between teachers and students?
- RQ3: What are important strengths, weaknesses, opportunities, and threats of the IL-course that relate to course quality?

We analyzed answers to these questions to determine the usefulness of the 4C/ID-model to design high quality whole task-centered IL-instruction.

2 Method

2.1 Participants

Seven university teachers of the distance premaster's program in Educational Sciences at the Open University of the Netherlands (OUNL) participated in this study (M_{age} = 41.9, SD = 8.7; 4 male). At the time of the data collection, each teacher had supervised, on average, 46 students in the literature review course (M = 45.9, SD = 24.7; Mdn = 55). Teachers considered themselves expert on information literacy (M = 8.1 on a 10-point scale; SD = 1.6) and advanced beginners in instructional design (M = 6.3; SD = 2.6) and the 4C/ID-model (M = 6.00; SD = 2.6). Three teachers had previously applied the 4C/ID-model to design instruction.

2.2 Materials

Course. The online course, 'Information skills for social scientists,' is part of the premaster's program in Educational Sciences of the OUNL. It teaches the fundamentals of conducting a literature review through a sequence of five learning tasks. The learning tasks are based on authentic tasks and feature the full process of conducting a literature review. Therefore, students learn the process from defining research questions to presenting the results of the review in a paper. The *completion strategy* is applied to guide students through the sequence of tasks [21, 22]. This means that students gradually practice steps of the literature review task by themselves. Since this is done in reverse order this guidance principle is called 'backward fading' [15, 23]. Table 1 presents the structure of the course and the application of the completion strategy to guide the learning process. For detailed information on the blueprint of the course we refer to Wopereis et al. [15]. The course is presented to the students in OpenU, an institutional learning and working environment of the OUNL [24].

Table 1. Course overview

	Learning Task 1	Learning Task 2	Learning Task 3	Learning Task 4	Learning Task 5
Define question(s)	Worked-out	Worked-out	Worked-out	Worked-out	Execute*
Search for sources	Worked-out	Worked-out	Worked-out	Execute*	Execute
Select sources	Worked-out	Worked-out	Execute*	Execute	Execute
Process information	Worked-out	Execute*	Execute	Execute	Execute
Present information	Worked-out*	Execute	Execute	Execute	Execute

*= focus of instruction

SEIN Questionnaire. The SEIN questionnaire is a course evaluation instrument used within the OUNL [17] that students complete after a course has ended. It includes multiple choice, rating, and open questions that record student perceptions of course quality (e.g., studiability, feasibility, and practicability) and time on task. Rating questions focus on the perceived quality of course constituents, instructional guidance, and instrumental support. Open questions are aimed at revealing strengths and weaknesses of these elements.

SWOT Questionnaire. The SWOT questionnaire aims at revealing strengths, weaknesses, opportunities, and threats [19, 20] that relate to the literature review course. It consists of four prompting questions related to the four constituents of a SWOT analysis. The format of each question was: "Mention {strengths, weaknesses, opportunities, threats} of the course. If possible make a distinction between issues related to the design, development, and implementation of the course." The questionnaire asks demographic questions as well as questions related to information literacy expertise and instructional design expertise.

2.3 Procedure

Teachers filled in both the SEIN and the SWOT questionnaire individually. We used SPSS to analyze the SEIN data. As these data were not normally distributed, a Mann-Whitney test was used to compare scores of teachers and students. We followed a thematic open coding procedure to analyze the SWOT data [19]. The first and second author of this paper clustered the teachers' responses individually. Subsequently, they compared and discussed results of both clusterings in order to reach full agreement on themes.

3 Results

We examined (a) teachers' perceived course quality, (b) teacher-student differences related to perceived quality, and (c) course strengths, weaknesses, opportunities, and threats to determine the suitability of the holistic approach to designing IL instruction. We present the results in that order.

3.1 Perceived Course Quality

The overall rating for the course was 6.9 ($SD = .9$) on a scale of 1 to 10. Teachers praised the scientific and practical orientation of the course and considered the course challenging for students (see Table 2, first column).

Table 3 shows the teachers' ratings and students' ratings for distinctive course features measured by the SEIN questionnaire. Respondents appreciated course constituents such as 'learning tasks', 'assessment task', 'supportive information', and 'teacher support'. They rated forum use low.

Table 2. Opinion on global course features by teachers (n = 7) and students (n = 48).

Statement	Agreement on statement (in %)	
	Teachers	Students
Practical level of the course is adequate	100	98
Scientific level of the course is adequate	100	98
Course is challenging	100	81
Learning goals are met	100	100

Table 3. Ratings course constituents (scale 1 to 10; 1 = poor, 10 = excellent) by teachers (n = 7) and students (n = 48).

	Mean		Mode		Skewness	
	Teacher	Student	Teacher	Student	Teacher	Student
Course overall	6.9 (0.9)	7.4 (0.9)	6	8	0.4	−0.5
Learning tasks	6.7 (1.3)	7.4 (1.1)	7	7	−0.7	−0.5
Assessment task	7.0 (1.0)	7.6 (1.0)	7	8	−1.4	−0.5
Supportive info	6.4 (1.1)	7.1 (1.1)	7	7	−0.2	−1.5
Teacher support	6.7 (1.4)	7.9 (1.3)	8	9	−0.4	−0.3
DLWE (OpenU)	7.1 (0.4)	7.4 (0.9)	7	7	2.6	0.3
Forum	5.4 (2.3)	6.2 (1.5)	6	7	−1.3	−1.3

Note: Standard deviations between brackets; DLWE = digital learning and working environment.

3.2 Differences on Course Quality

Mann-Whitney tests on teachers' and students' ratings (see Table 3) showed a difference only on perceived teacher support (i.e., cognitive feedback). Students rated teacher support more highly (Mdn = 8) than teachers (Mdn = 7), $U = 90.5$, $p = 0.045$, $r = -0.27$. Figure 1 presents a bihistogram of the distribution of the ratings. It shows that the seven teachers had different opinions on the quality of this variable. Interestingly, the teachers who were more involved in the design of the course seemed to be more positive on the feedback than the teachers who served merely as instructors and coaches.

3.3 SWOT Analysis

The teachers generated 63 statements, identifying 16 strengths, 24 weaknesses, 11 opportunities, and 12 threats. Analysis of statements resulted in 4 main themes about strengths, 4 about weaknesses, 3 about opportunities, and 3 about threats. Table 4 presents the main themes for each SWOT category.

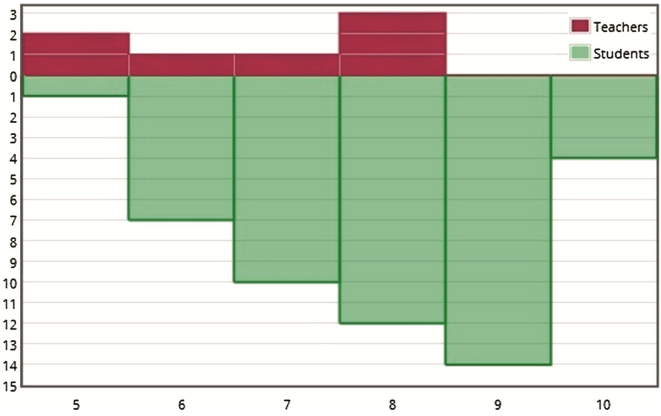

Fig. 1. Bihistogram ratings for teacher support

Table 4. Main themes SWOT analysis.

Strengths (n = 16). Main themes:	Weaknesses (n = 24): Main themes:
• *Whole task approach.* Students learn the complex skill by solving authentic 'whole-task' problems • *Scaffolding.* Gradually decreasing instructional support and guidance and increasing self-activation • *Guidance.* The learning process is guided by partially completed process work sheets • *Feedback.* Students receive extensive cognitive feedback on task performance after the fourth learning task	• *Constructive alignment.* No perfect alignment between learning goals, content, and assessment • *Curriculum coherence.* Skills like reading and writing (academic) texts are wrongly considered prior knowledge • *Materials update.* Adapting course materials can be costly and labor-intensive when specialist skills are lacking • *Feedback.* Cognitive feedback on the fourth task is labor-intensive
Opportunities (n = 11); Main themes:	Threats (n = 12): Main themes:
• *IL skills education*. Course might be a starting point for the development of a learning-teaching trajectory for learning (academic) IL skills • *Academic skills education.* Integrating (academic) IL skills into a broad academic skills curriculum • *Collaborative learning*. To improve learning and to address problems related to scalability CSCL-formats could be implemented	• *Plagiarism*. The open nature of the course makes it possible to exchange and copy student work • *Scalability*. An increase of students might hamper adequate teacher support (i.e., providing feedback) • *Curriculum coherence*. Autonomy of teacher teams may result in poorly aligned curricula

We identified four main themes related to *strengths*. They all related to distinctive design guidelines of the 4C/ID-model. The first theme emphasized the importance of whole, authentic tasks as points of departure in the design process. One teacher, for instance, stated that "[in the course] students practice the systematic approach to problem solving [i.e. conducting a literature review] in its entirety." The second theme aimed at course structure and stressed that instructional support within a sequence of learning tasks should decrease

over time. A teacher said: "Throughout the course the students increasingly perform parts of the whole task themselves." The third theme underlined the importance to apply process worksheets to learn the complex literature review skill. A concise teacher statement on strengths read: "Use of process worksheets." The fourth theme stressed the power of feedback. One teacher appreciated the "… extensive formative feedback that students receive after the fourth learning task", which was considered an additional "… excellent learning experience."

Feedback was not only a strength. It was also one out of four main themes related to *weaknesses*. Or, as formulated by one teacher: "Providing feedback [in this course] is demanding." Another main theme on weaknesses was constructive alignment. "Constructive alignment is rather weak: assessment, practice, and materials are not aligned. For example, academic writing skills are assessed, not taught." This weakness was related to the third main theme, namely curriculum coherence. Some skills like academic reading and writing were regarded as prerequisites while they were not part of the presupposed skill repertoire of students. A teacher said: "For instance, there are course entry requirements [i.e., knowledge and skills] that refer to courses that no longer precede the current course, due to a redesign of the curriculum." The fourth main theme on weaknesses was materials update. One teacher mentioned that "updating [instructional] videos is not easy and requires specialist knowledge and skills."

The category *opportunities* covered three main themes on issues that might be beneficial to course quality. First, the course was regarded a solid base for designing a learning-teaching trajectory on information literacy: "Several task classes [on academic IL instruction] could be developed." Second, the course would be an ideal 'point of departure' for an integrated and broad academic skills curriculum. One teacher said: "This course is suited to provide a basis for more academic skills, such as formulating research questions and critical reading." Collaborative learning was regarded a third thematic issue. According to some teachers both the effectivity and efficiency of learning could be improved when students work together on learning tasks. One teacher, for example, mentioned the surplus value of well-implemented peer feedback both for optimizing learning output among learners and saving time on task for teachers.

The *threats* to course quality were classified in three main themes. The first theme included issues on plagiarism. A teacher wrote: "Learning tasks should be replaced because students are copying each other's work." Scalability was regarded another important threat. As one teacher mentioned: "The current approach is not scalable: a large increase of students will result in a heavy workload for the teachers." The final thematic threat related to curriculum coherence. Teacher teams who work too autonomously create courses that are isolated entities in the curriculum. A teacher suggested that the "… contents of this course should be more aligned with other courses, such as academic writing."

4 Discussion

In this study we analyzed the quality of a whole task-centered IL-course in a university setting to establish the usefulness of a holistic approach to instructional design. We focused on teacher perspectives of course quality and posed three research questions.

Our first research question aimed at revealing perceived course quality. Ratings of teachers showed that Four-Component Instructional Design (4C/ID) can result in a challenging course that is scientifically sound and useful for practice. Beside the acclaimed nature of the course, ratings indicated that teachers appreciated the underlying instructional blueprint. Teachers highly valued course constituents like learning tasks, supportive information (i.e., the theory), and structured guidance (i.e., scaffolding). The SWOT analysis confirmed this.

Our second research question aimed at revealing congruity and diversity in teacher and student ratings. Results of non-parametric tests showed that appreciation of the course was similar between teachers and students. The only difference concerned a more critical stance of teachers towards the feedback they gave. Interestingly students were more positive on the feedback component of the IL-course seen in medium effect size.

Our third research question aimed at revealing the strength, weaknesses, opportunities, and threats of this course as experienced by the teachers. This qualitative, in depth analysis of course characteristics emphasized the strength of the instructional blueprint which confirmed the added value of using the 4C/ID-approach to design effective IL-instruction. However, the SWOT-analysis also revealed that the implementation of a 4C/ID-based blueprint for whole task-centered IL-instruction may lead to heavy workload for teachers (i.e., provision of adequate feedback and regular update of study materials). This is mainly seen as a threat when the number of students will rise. Another threat is the lack of curriculum coherence. Strong autonomy of teacher design teams may result in discontinuous IL-learning-teaching trajectories [25] that hamper student learning. Education should emphasize the design of (constructively, well aligned) coherent IL-trajectories that also address critical thinking skills [26, 27]. The present IL-course might be an interesting starting point for the development of a large-scale IL-trajectory, embedded in a broader academic skill learning context. The 4C/ID-approach can help to design such large-scale curriculum.

5 Conclusion

This study showed that teachers appreciate whole task-centered IL instruction that is 4C/ID-based. Affirmed by previous studies [15, 28] we therefore can conclude that the 4C/ID-model is most suitable to designing IL-instruction. It provides teachers, librarians, and other designers of IL-instruction with the necessary design guidelines and instruments to frame a good quality instructional blueprint. However, the study also indicated that sufficient time needs to be allocated to the development, implementation, and maintenance of instruction in order to prevent constructive misalignment of learning goals, content, and assessment within and across courses [29]. This emphasizes the importance of building curriculum design teams that have a good overview on IL-learning-teaching trajectories and other components of the curriculum [25].

Future research should aim at framing guidelines for designing, developing, and implementing coherent whole task-centered IL-programs that exceed ‘one-shot’ IL-sessions. Educational design research on 4C/ID-based whole-task IL-instruction might be a useful approach to address this issue [30].

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