



Transferring High Quality Care of the Elderly into the Clinical Workplace: Barriers and Facilitating Factors

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Authors' contributions

This work was carried out in collaboration between all authors. All authors designed the study and wrote the protocol. Author SP wrote the first draft of the manuscript and managed the literature searches. Authors SC and CDK conducted the interviews. Authors KH and BJ coded the data and author SP performed the data analysis. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Medical students experience difficulty transferring what they have learned in the classroom into the clinical workplace. Learning environments based upon whole-task learning can help medical students to apply knowledge, skills and attitudes into their clinical practice. However, little is known about how students experience the transfer from such a whole-task learning environment into the workplace.

Aim: This study aims to identify the factors that students perceive to be facilitating and hindering the transfer of learning.

Methodology: Semi-structured interviews were conducted. The principle of data saturation was applied. The interviews were coded by two independent researchers and analysed using thematic analysis. The inductive coding process (both descriptive and interpretive) identified recurring themes.

Results: The barriers and facilitating factors that were identified as influencing the transfer of learning were linked to elements within the classroom (e.g. lack of practical protocols), the clinical workplace (e.g. supervisor not aware of what student learned in classroom) and students'

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motivation (e.g. interest in the topic).

Conclusion: Despite the focus on whole-task learning environments, students did not find the application of knowledge, skills and attitudes in the clinical workplace easy. Future research needs to investigate how the perceived barriers can be avoided.

Keywords: Postgraduate; primary healthcare; transfer (psychology); learning environment.

1. INTRODUCTION

The ageing population creates a big challenge for the health care sector [1]. Care of the elderly is very complex due to the possible presence of multimorbidity, frailty and polypharmacy issues. In order to deal with these situations effectively and efficiently, an integration of different competencies is required. The general practitioner plays a central role in the delivery of interdisciplinary care to the elderly [2] as a manager, collaborator, communicator, professional, health advocate, medical expert and scholar (CanMEDS roles) [3].

Medical students often feel unprepared for their future position as general practitioner and have difficulty transferring what they have learned in the classroom into the clinical workplace [4-7]. The transfer of learning, which is the correct application and refinement of knowledge, skills and / or attitudes in a context that is different to the one in which it has been learned [8,9], appears to be a complex and dynamic process [10]. This is due to the situated character of learning, which is specific to and dependent upon contextual factors, and the many variables involved [11,12].

Learning environments based on a whole-task learning model, such as the 4C / ID (Four-Component Instructional Design) model, aim to facilitate this transfer of learning and prepare medical students for the integrated performance of the different CanMEDS roles necessary for dealing with complex clinical situations [13-16]. The 4C / ID model consists of the following four components: Learning tasks, supportive information (the theory), procedural information (the how to's) and part-task practice (focused repetitive practice). Within this instructional design, the learning always starts with tasks that are based on authentic real-life situations. As the complexity increases throughout the sequence of learning tasks, the available support and guidance decreases [13].

As yet, little is known about how students experience the transfer of learning from a learning environment that is based on the whole-

task 4C / ID model and which factors play a role in this process. Therefore, this study aims to identify the factors that students perceive to be facilitating and hindering the transfer of learning from a whole-task 4C / ID learning environment into the clinical workplace.

2. METHODOLOGY

2.1 Research Population

First year students in post-graduate general practice training at KU Leuven, Belgium.

2.2 Instructional Intervention

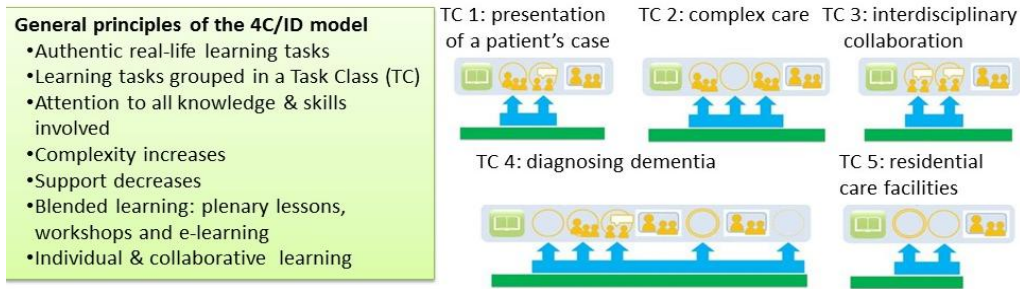
The medical curriculum of the general practice course at the KU Leuven was revised and redeveloped according to the 4C / ID model [16]. Different learning modules were created, including one titled Care of the Elderly (see Fig. 1).

2.3 Research Design

Face-to-face semi-structured interviews were conducted with a random sample of a group of students. The 17 open-ended interview questions were based on literature relating to the transfer of learning and validated by two educational experts and an expert in care for the elderly. Two pilot interviews were conducted in order to test the interview questions and to practice interview techniques. The interviews took place where the participants felt most comfortable. In most cases this was at the participants' home.

The interviews were recorded and transcribed verbatim. The principle of data saturation was applied. The interviews were coded and analysed by two independent researchers according to the method of thematic analysis [17]. Data were analysed using the software program QSR International's NVIVO version 10 [18]. The analysis process was enriched by the different backgrounds of the researchers (professor of general practitioner, medical students, professor with experience in the area of care of the elderly and a researcher with an educational background). The line-by-line coding

4C/ID model: Learning module *Care of the Elderly*



Four major components of 4C/ID model

Varying learning tasks	Supportive information	Procedural information	Part-task practice
Reflect the GP's tasks e.g. Read the patients' case and the results of the mini-mental state examination. Develop a care planning.	Theory that supports problem solving and reasoning e.g. General information about dementia.	Just-in-time and step-by-step e.g. Guidelines about how to use the mini-mental state examination.	To strengthen automation e.g. Practicing the application of the mini-mental state examination.

Fig. 1. The 4C / ID model 'Care of the Elderly' (based on [13,16])

of the text led to the development of 'descriptive themes' (remained close to the primary data) and 'analytical themes' (characterised a stage of interpretation whereby the researchers went beyond the primary data). After the inductive coding process, recurring themes were identified.

3. RESULTS AND DISCUSSION

3.1 Participants

Thirty-nine of the 150 students participating in this learning module were randomly assigned and invited to participate in this study. Sixteen (response rate of 41%) responded positively and were interviewed. The demographic data of the participants are shown in Table 1. The average age of the participants is 25 years old.

3.2 Facilitating and Hindering Factors for the Transfer of Learning

This study identified *facilitating* and *hindering factors*, regarding the transfer of learning, linked to elements in the classroom, the clinical workplace and students' motivation (see Table 2). Additionally, various underlying conceptions of learning have been revealed.

Table 1. Demographic data of the participants

	n (%)
Total amount of participants sex	16(100%)
Male	3 (19%)
Female	13 (81%)
Amount of learning tasks completed	
All	4 (25%)
Some	10 (62%)
None	2 (13%)
Amount of plenary sessions followed	
All	11 (69%)
Some	5 (31%)
None	0 (0%)
Independently performing Consultations during the internship	
Yes	13 (81%)
No	3 (19%)

3.2.1 Classroom

Within the classroom (the learning setting where students build theoretical and practical foundations as preparation for their internship), several facilitating and hindering factors for the transfer of learning were identified. Learning tasks with high perceived relevance for clinical practice and case-based plenary sessions were mentioned to enhance transfer to the workplace.

"That you already know the Katz index, that you know how it works, that you know which types of nursing homes exist and what you need to keep in mind, those assessment instruments. I think that made it easier to be able to follow in real life." (S4)

Another facilitating factor for the transfer of learning was interprofessional exchange. In one case, students referred to an interdisciplinary session with pharmacy students about how to make a prescription. In another case, students cited the visit of an external practitioner, a nurse, who had a lot of experience with the care of the elderly and was able to answer the students' questions about a specific learning task.

A hindering factor for the transfer of learning, as experienced by several students, was a lack of guidance while completing the learning tasks.

"... but I didn't really know how to practically start, how it works, waiting lists or not, which documents, health insurance." (S9)

Furthermore, students expressed that it was disconcerting when they didn't know where to find certain information for the learning tasks. Another barrier for the transfer of learning was a lack of feedback from the teacher about the learning tasks.

"... often they [teachers] don't provide feedback about the tasks in the plenary sessions... you make those tasks and then afterwards they don't do anything with it... you don't know the answer... That is frustrating." (S10)

Some participants referred to the absence of practical tools, which could give support while applying and practising knowledge, skills and attitudes during the internship, as another factor that discouraged the transfer of learning.

"I didn't really have lots of practical steppingstones that I could use afterwards during my internship." (S1)
"Protocols, something more concrete to work with." (S2)

3.2.2 Clinical workplace

Within the clinical workplace (the setting where students practice with real patients what they

have learned in the classroom, e.g. early clinical experience and internship), various facilitating and hindering factors for the transfer of learning were identified.

3.2.2.1 Theory versus practice

Students mentioned that the transfer of learning was difficult as theory and practice seemed to be disconnected from each other. Various explanations were highlighted. Firstly, when reflecting on their internships, some students indicated that they had been confused about which organisations GP's were expected to collaborate with as they appeared to vary in different regions throughout Flanders. Secondly, theory and practice were often perceived as disconnected from each other because, in the clinical setting, the application of learned theory requires tailoring to the individual patient's circumstances.

"Yes, the situation is never the same. I think that is very individual and that you need to see what is possible and desirable for which person." (S12)

"It is always different in practice... So you can never be prepared for that I think, how you are going to deal with that." (S16)

Thirdly, several students explained that the workplace supervisor (the person who facilitated students' learning at the clinical workplace) was not the best role model because he himself was not applying what students learned. The knowledge and skills that students acquired in the classroom seemed to be different to what was happening at the workplace. The following interpretations were given: The workplace supervisor was at the end of his career and didn't want to focus on the latest evidence-based medicine, the supervisor preferred to have his own way of working and the supervisor was not aware of, or wasn't interested in, what students learned in the classroom. Several students explained that, if workplace supervisors didn't know what students had learned, they were not, or less, able to trigger and encourage the students to apply that in practice. This discrepancy occasionally appeared to lead to confusion:

"The workplace supervisor was not aware of the procedures the medical teachers taught us at the university so we were learning two different things and we didn't know anymore what was right or not." (S1)

Table 2. Thematic matrix: Students’ perceptions of facilitating and hindering factors to the transfer of learning

	In the classroom	At the clinical workplace	Students’ motivation
Facilitating factors	<ul style="list-style-type: none"> • Case-based learning • Tasks with high relevance for practice • Interprofessional exchange 	<ul style="list-style-type: none"> • Workplace supervisor shares information/experiences • Receiving support and advice • Being prompted to check course materials • Being triggered to think 	<ul style="list-style-type: none"> • Case-based learning • Tasks with high relevance for practice
Hindering factors	<ul style="list-style-type: none"> • Lack of procedural support • Not knowing where to find information • Lack of feedback • Lack of practical tools 	<ul style="list-style-type: none"> • Regional differences • Theory requires tailoring to patient’s circumstances • Supervisor doesn’t apply what students learned • Low incidence • Patients’ resistance • Supervisor not giving permission to practice independently • Lack of feedback • Lack of encouragement and support 	<ul style="list-style-type: none"> • Lack of feedback in the classroom • Workplace supervisor not giving permission to practice independently • Too time consuming learning tasks

3.2.2.2 Having limited opportunities

The participants also mentioned that the limited opportunity to practice what they had learned was an issue they encountered in the clinical setting. One cause of this obstacle to the transfer of learning was that students did not come into contact with, or encountered a low incidence of, situations in which they could apply what they learned. Another cause, experienced by one student, was that some patients showed resistance towards a student taking over the activities of their regular GP.

“I found these patients [elderly] the most difficult to do it [the consultation] myself because they were often the patients that were a bit more negative when they saw me for the first time. ‘Oh, you are someone who doesn’t know us at all and we are coming here every month and then we don’t need to explain our whole situation but to you we even need to explain much more.’” (S6)

Along with the patients’ consent, students needed the workplace supervisors’ permission to perform a consultation independently. Some students appeared to be limited to only observing the workplace supervisor in action rather than performing the consultations themselves. These limited opportunities to practice hampered the transfer of learning.

3.2.2.3 The role of the workplace supervisor

Many students identified the significant impact that the workplace supervisor had in the transfer process. A lack of feedback, encouragement and support from the supervisor was felt to be an inhibiting factor by some students. However, other students felt that the workplace supervisor enhanced the transfer of learning in a number of ways during the internship: Sharing information and experiences with them, offering support and advice to them whilst they attempted to apply what they had learned in the classroom, and prompting them to reflect on practical experience and revise course materials to improve their performance in the clinical workplace.

“They really let you think independently: ‘how would you deal with this, how would you do it?’ Also for complex medications: ‘what would you drop, what do you think is not necessary?’ Also for the situation at home: ‘how would you deal with the daughter?’” (S16)

3.2.3 Students’ motivation

The students’ motivation for learning and transfer appeared to vary between participants. The students’ level of motivation already played a role before medical students engaged in the course and also varied over time. Many students

referred to the need for high quality care for older patients, the increasing amount of older patients requiring care and the complexity of the care required by the elderly patients (e.g. multimorbidity and polypharmacy) as motivating factors which prompted them to start the course.

"... the absence of sufficient care of the elderly only reinforces the need and the importance of care of the elderly." (S1)

"It is a big part of the population... multimorbidity and polypharmacy. And this combination is very interesting but very difficult, and that makes it a big challenge..." (S9).

However, some participants perceived this complexity as a disincentive for following the course.

"It is not really my biggest interest, just because it is so complex and vague." (S5)

Throughout the course, students' motivation for learning and transfer was affected by facilitating and hindering factors in the classroom and in the workplace. The factors that students referred to are indicated in Table 2.

3.2.4 Underlying conceptions of learning

Students' conceptions of learning appeared to vary depending on the context in which the learning took place, either in the classroom or in the clinical workplace.

3.2.4.1 Learning in the classroom

Most participants thought that the amount of available information was excessive and experienced this as a barrier to their learning.

"...Already during the first [learning task] I quickly had the feeling that there was too much information and too many sources were given... as a result you quickly drop out." (S7)

Moreover, most interviewees described that completing the learning tasks took a lot of time and that there were too many learning tasks. Students suggested that they would have preferred to receive the information pertaining to the learning tasks from their medical teacher instead of having to look it up themselves.

"Not preparing it [learning tasks] in advance, just give us the information and we start from that, but in this way you lose a lot of time to try to find it yourself." (S1)

Additionally, students expressed the need for concrete and unambiguous solutions to be provided after the completion of the learning tasks.

"It [the learning task] was gone over very vaguely, but not concrete like, 'This is what you need to do, as a GP these are your tasks, make sure you arrange this paper work.' I would prefer a concrete protocol or something like that. 'Do this or that.'" (S10)

"...that you get concrete answers and a plan 'you need to do this, you need to do that'" (S3)

3.2.4.2 Learning in the clinical workplace

Some participants characterised the learning during their internship as 'trial and error' and learning by doing.

"I think that with regards to the care of the elderly that you need to discover it in practice." (S15)

"I think that you will learn a lot about it if you are doing it by yourself." (S14)

Additionally, students noted that learning in the workplace was their own responsibility.

"I felt that I was sitting behind the wheel, actually, what I achieve and what I would like to do is totally in my own hands and others wouldn't do it for me." (S1).

3.3 Discussion

3.3.1 Comparison with the existing literature

Recent reviews about transfer of learning, in other areas than medical education, identified three groups of influential variables: learner characteristics, training design and the work environment [8,9]. Some elements of these three groupings corresponded with the groups into which the comments of the participants in this study were coded: The learner's motivation, perceived utility of the course, content relevance, feedback moments, opportunity to perform and supervisory support. Other recent studies showed that a motivating and supporting workplace supervisor was very important to stimulate transfer of learning [19,20]. Transfer

was, among other things, enhanced when the workplace supervisor was a positive role model, provided information, gave feedback, showed interest in the learning experiences of the course and anticipated what kind of clinical situations were relevant for applying certain knowledge and skills learned in the classroom [20]. This was in line with the students' comments about their workplace supervisors in the present study.

Students expressed that the focus on the 4C / ID model could enhance the transfer of learning. Nevertheless, students have specific expectations about learning tasks and plenary sessions that are not always in line with the intentions of the 4C / ID model. Students in this study expressed an interest in having concrete answers for learning task, viewing the answers themselves as the 'learning product', while the 4C / ID model is constructed in such a way as to view the process of completing a learning task as a 'learning product'. Moreover, due to the complexity of the gerontology field of medicine, it is not always possible to have a clear-cut and concrete answer to complex clinical situations [2]. The students in this study found it difficult to manage this complexity and this appears to have been a source of insecurity. However, it is noted by the researchers that this insecurity is not necessarily a negative outcome as it is important for students to learn to deal with complexity and unfamiliarity in general practice [21]. Additionally, most students experienced the large amount of information available to complete the learning tasks as excessive and demotivating. The interviewees thought that it was required to read all the available information in order to complete a learning task. However, the aim of the 'supportive information' and 'procedural information' in the 4C / ID model is to offer the students some guidance whenever they need it while completing a learning task. The information is optional [13]. Previous research documented that, in cases where the students' interpretations are not similar to the intentions of the designers of the learning environment, it is possible that some parts of the learning environment will be used in a different way to that for which it was originally intended [22,23]. Consequently, it is important for students to be informed about the ideas behind the whole-task learning approach [24]. However, the large amount of available information can cause an extraneous load. Extraneous load is one type of cognitive load, which does not directly contribute to learning. Extraneous cognitive load may result, for

example, from students having to use information sources that are dispersed in different places or when students need to search for the necessary information in order to complete a learning task [14]. In order for effective learning to take place, it is necessary to minimise the extraneous cognitive load [14].

Beside the discrepancy of students' ideas and the teachers' intentions of the classroom-based learning, a dichotomy between classroom-based and workplace-based learning was recognised. This apparent disconnection between the learning in the classroom and at the workplace is consistent with previous research in the field [25]. Several interfering factors have been named, such as workplace supervisors not being aware of what was learned in the classroom [25,26], workplace supervisors performing procedures in a different way than what medical teachers taught in the classroom [27] and a mismatch of learning goals between medical teachers and workplace supervisors [28], but this study also identified the potential role of students' conceptions of learning. The interviewees of the present study reported that learning in the classroom was built on the central role of the medical teacher (the person who facilitated students' learning in the classroom), who offered structure and guidance. Previous research has identified this conception of learning as 'teacher-centred education', in which the learning can be described as relatively passive, with the teacher as the key figure [29]. Contrastingly, the students' descriptions of the learning that took place at the workplace were more consistent with a 'student-centred education' view, in which the students have significant responsibility for their own learning [29]. The participants also mentioned that workplace-based learning was dependent on the situation and various influential factors.

Earlier studies suggested that more collaboration and communication about what is or is not allowed and expected, might enhance the link between both learning contexts and, therefore, possibly foster the transfer of learning [26,28]. Hence, the question that emerges is how this collaboration should take place. Additionally, future research could also concentrate on how to support students by maximising the potential practice opportunities at the workplace, as clinical experience alone is not sufficient for useful learning [28].

3.3.2 Strengths and limitations

Although the response rate to the first call for participants is moderate, the participant group appears to be a good representation of the student population of the first year general practice cohort at the KU Leuven. Additionally, the range of positive and negative comments emerging from the interviews, suggest a neutral sample of the cohort's experience. Another strength of this study is that the interview consisted of a general section (regarding the overall learning module) and a specific section (regarding two specific learning tasks), which led to a more nuanced representation of the students' perceptions. The participants expressed contrary views with regards to general and specific questions about the extent to which the module was applicable to their internship experience. It might be possible that students' responses on the general questions were related to an overall feeling or emotion towards the learning module (an example of the 'halo effect') despite the fact that the specific questions were not related to that general feeling or emotion [30]. The interviews were conducted by two students of the first year general practice course. This can be seen as a strength (e.g. interviewer and interviewee are in the same position and less chance of students responses simply conforming to socially desirable answers) but also as a potential limitation (e.g. lack of research experience, influence of personal relationship with interviewee and influence of peer pressure). However, the whole process was supervised by two researchers who were experienced with qualitative research and the area of medical education. A limiting factor of this study is that the interview questions only focused on one learning module.

4. CONCLUSION

Despite the focus on whole-task learning environments, students did not find the application of knowledge, skills and attitudes in the clinical workplace easy. This study has contributed to a deeper understanding of students' perceptions of crucial variables that influence the transfer of learning (e.g. being prompted to check course materials during clinical practice experiences). The main implication of this study is that the transfer of students' learning could benefit from better congruence of the students', teachers' and workplace supervisors' learning goals and expectations.

CONSENT

All authors declare that 'written informed consent was obtained from the participants for publication of this study.

ETHICAL APPROVAL

This study was approved by the Ethical Commission of the KU Leuven (Reference number ML10504).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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