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Flexible higher education: lifelong professional competence development in work-based settings

DEEL 1: HET ONDERZOEK IN GROTE LIJNEN

Inleiding

Het hoger onderwijs richt zich in toenemende mate op het ontwikkelen van competenties in het kader van life long professionele ontwikkeling. Bachelor- en masteropleidingen worden gezien als een start voor professionele leertrajecten die leiden tot bekwaam en deskundig professioneel handelen (Palonen e.a., 2014). Vanwege de snel veranderende eisen van de arbeidsmarkt en innovatie binnen professionele domeinen (zie Susskind & Susskind, 2015), zijn flexibele leertrajecten nodig in mono- en interdisciplinaire contexten.

Studenten en startende professionals in diverse vakgebieden maken zich vaardigheden en competenties eigen en ontwikkelen zich tot vaardige en autonoom handelende professionals. (zie Lehtinen, e.a., 2014). In zorgopleidingen wordt dit proces vaak gemodelleerd door geleidelijke toewijzing van professionele activiteiten (EPA's; zie Ten Cate et al., 2015). Het realiseren van dergelijke trajecten kan alleen als universiteiten en hogescholen en de professie zelf hierbij samen werken en gezamenlijk flexibele leer-werkomgevingen ontwikkelen waarin werkplek leren, blended learning en professionele leerlaboratoria worden afgewisseld met formeel onderwijs en vormen van praktijksimulatie.

Meer inzicht is nodig om flexibele curricula te ontwerpen die zijn gebaseerd op EPA's of vergelijkbare vormen van kritische professionele activiteiten. We stellen een vergelijkend onderzoeksprogramma voor over de ontwikkeling en implementatie van leertrajecten in verschillende professies die gebaseerd zijn op werkpleklernen: wat kunnen we leren van verschillende trajecten voor professies als ingenieurs, medische en gezondheidsdeskundigen en educatieve professionals? En hoe kunnen dergelijke trajecten duurzaam worden ontwikkeld voor toekomstige behoeften van de arbeidsmarkt?

De centrale onderzoeksvraag die we stellen is: "Hoe kan de ontwikkeling van flexibele expertise tijdens het leren op de werkplek gestimuleerd worden?"

Onderzoeksopzet

In dit project werken we vanuit een realist evaluation benadering: leerdeskundigen in het hoger onderwijs bouwen hun onderwijsprogramma's op theoretische veronderstellingen, die min of meer expliciet zijn. In het essay wordt een voorlopige programmatheorie gepresenteerd, gebaseerd op de innovatieve benaderingen voor educatieve programma's van HAN-UAS en het Radboud Universitair Medisch Centrum (Hoeve et al, 2019; Sagasser et al, 2017). De realist aanname is dat programmatheorieën in bepaalde contexten leiden tot verschillende mechanismen en uitkomsten. De realist benadering probeert uit te leggen in welk opzicht, voor wie, in welke context en waarom een programma werkt.

Het project is ontworpen met een interactieve aanpak in het achterhoofd: tijdens de onderzoeksfasen willen we samen met de consortiumpartners de gemeenschappelijke kenmerken van onze theoretische veronderstellingen onderzoeken. De eerste fase van het project is niet alleen bedoeld voor het beoordelen van de wetenschappelijke literatuur over flexibele expertise-ontwikkeling, maar ook voor

het bouwen van een gemeenschappelijk theoretisch fundament voor het partnerschap. Belangrijke theoretische bouwstenen hierbij zijn onder meer 'constructieve transfer', 'case-based redeneren', 'het werken met slecht gestructureerde problemen' en 'toe te vertrouwen professionele activiteiten'. We willen de theorieën die in gebruik zijn samen met de consortiumpartners onderzoeken om zo een gemeenschappelijke programmatheorie te ontwikkelen. Consortiumpartners worden uitgedaagd om de veronderstellingen die ten grondslag liggen aan hun innovatieve interventies met het oog op het vergroten van flexibele expertise bij hun studenten, expliciet te maken. Dit zal leiden tot een gemeenschappelijke programmatheorie als basis voor het specificeren van vragen, ontwerp en output.

De programmaleiders en het consortium

Consortiumpartners vanuit verschillende professionele domeinen (zoals artsen, ingenieurs, leraren, verpleegkundigen, politieagenten, advocaten, therapeuten) worden uitgedaagd om educatieve modellen uit hun onderwijspraktijk te delen en om deel te nemen aan een ontwerpgericht onderzoeksprogramma om deze educatieve modellen te vergelijken, te verbeteren en te evalueren. Door bachelor- en masterprogramma's van verschillende opleidingen van zowel universiteiten als hogescholen bij elkaar te brengen kunnen we intensief gebruik maken van elkaars ervaringen en expertise en van elkaar leren. Het delen van onze onderwijskundige kennis en ervaringen is essentieel om flexibel hoger onderwijs te ontwikkelen voor een steeds complexer wordende arbeidsmarkt.

Dat betekent dat de consortium partners:

- Bereid zijn tot multidisciplinaire samenwerking
- In staat zijn om te interveniëren in lopende onderwijsprogramma's
- Relevante en te onderzoeken domeinen kunnen inbrengen
- Een HBO dan wel WO opleiding aanbieden
- Werken in domeinen waarbinnen veel verandering plaatsvindt en sprake is van snelle kennisoefening
- Sterk verschillen in de professionele domeinen om zo ook context heel expliciet mee te nemen in het onderzoek

De twee programmaleiders professor Nieuwenhuis en dr. Fluit hebben beiden een sterke focus op werkplekleren. Zij werken in verschillende PhD-trajecten van medewerkers van universiteit en UAS samen. Uitwisseling van onderzoeksresultaten en papers vindt plaats tijdens lokale onderzoeksbijeenkomsten. Het Radboud Universitair Medisch Centrum Nijmegen en HAN hebben een samenwerkingsovereenkomst getekend om samen te werken aan interprofessioneel leren en opleiden in de zorg.

DEEL 2: DETAILED DESCRIPTION OF THE PROJECT

1. Educating professionals for an uncertain future

Regular universities and universities of applied sciences (UAS's) are increasingly challenged to educate professionals for an uncertain future. Due to technological changes, up-speeding information technology and global socio-economic developments, the future of professions is unpredictably complex and dynamic (Susskind & Susskind, 2015). Educating professionals like doctors, engineers, teachers, nurses, police officers, lawyers and therapists is increasingly a matter of lifelong development. Bachelor and master education can be seen as the kick-off for lifelong learning trajectories, in which professionals have to develop from a novice status towards an expert status and have to adapt to unforeseen developments by learning and innovating. Flexible expertise is increasingly important (Feltovich, Spiro en Coulson, 1997).

Innovation and development of the professions is not a matter of fate: professionals themselves play a major role in the renewal of their profession. Health care is an example of such a process: professionals deliver high level services (i.c. patient care), they innovate health care for example through developing new technologies and doing research, and these professionals educate the next generations of professionals. Innovation and lifelong learning become essential parts of the professional habitus (cf. Carnegie Program Educating the Professions, e.g. Sheppard et al., 2009; Benner et al, 2010). These developments challenge universities to deliver adaptive bachelor and master courses in order to generate flexible expertise and lifelong learning skills and also to let students getting acquainted with innovative professional practices. Work-based learning¹ (WBL) becomes a common feature of adaptive educational programs, eliciting new forms of professional development and matching assessment processes. Open curricula stimulate a focus on self-regulated learning processes next to the acquisition of professional knowledge and skills.

2. Expertise development between cognition and social context

Professional expertise is a complex concept. Expertise is often defined by its outcome: if the product or service delivered is of high quality, the producer is a craftsman or an expert. Feltovich, Prietula and Ericsson (2006) synthesize several characteristics of expertise:

- Expertise is limited qua scope (domain specific) and high performance does not automatically transfer to other domains;
- Content and knowledge are basic for expertise
- Expertise refers to larger and more integrated cognitive units
- Expertise implies functional, abstract representations of knowledge and information
- Expertise is based on automated routines
- Expertise implies selective entrance to relevant information
- Expertise implies reflection
- Expertise is adaptation (of attention, of working memory of entrance to long term memory)
- Experience alone is not sufficient for expertise development.

Expertise and craftsmanship can thus be seen as a concentrated 'state-of mind', on top of a high quality knowledge base resulting in cognitive and physical high quality operational repertoire. Expertise is developed during a long lasting process (rule of thumb: 10.000 hours) of deliberate practice supervised by masters and other experts (cf. Ericsson 2006).

In many professional fields students and novice professionals develop skills and competences leading to deepened professional skills and autonomous professional behavior (cf. Lehtinen, e.a., 2014). In the domain of health education this process is modeled through gradual entrustment of professional activities (EPA's; cf. Ten Cate, e.a., 2015). Entrustment is an interactive, social process: other professionals or external bodies allow the novice to execute professional tasks through informal evaluation or formal qualification. The interaction between 'mentor' and 'mentee' turns out to be a crucial process in the professional development of students (Kroeze, 2014).

Sustaining such trajectories requires joint pedagogical interventions of both universities and professional spheres and flexible educational delivery, in which work-based learning, blended learning and professional learning labs alternate with university-based training and simulation courses.

3. Developing adaptivity

¹ We use work-based learning as an umbrella term for related terms as internships, work-integrated learning, professional learning labs and so on. In all such initiatives professional practice is steering learning activities of student professionals; university teachers have to adapt their teaching practices in order to enhance professional development of their students.

Lehtinen, Hakkarainen and Palonen (2014) built a learning theory for the professions in times of rapid change. Central in their argument is a new perspective on transfer of knowledge. Traditional higher education is mainly relying on an application model of transfer: knowledge and skills learnt in education are meant to be widely applicable in a diversity of professional situations. This application model stands on the assumption that tasks are rather stable and that transfer “reproduces existing relations between fixed tasks”. In times of rapid change, fixed tasks are becoming rare, and the professional should be prepared for future learning activities. Lehtinen et al. suggest replacing the application model of transfer with a construction model, in which the professional produces and constructs relations of similarity: the professional interpretation of new situations and phenomena as starting point for deliberate practice of new skills and applicable knowledge. A knowledge-creating metaphor of learning inspires new models for professional education to deal with rapid changing situations. Jonassen, Strobel and Lee (2006) argue in the same vein that the traditional view on transfer does not prepare technical students for everyday problem solving; they stress the need for preparation for future learning in working situations. “In modern engineering contexts the need for continuous lifelong learning has never been greater”. Professional education programs should support learning to solve complex and ill-structured workplace problems in order to prepare students for future learning and work. Hatano and Inagaki (1986) discern routine expertise and adaptive expertise as poles of one dimension. Routine expertise is the execution of high quality procedures in order to act efficiently and accurately. Adaptive expertise is the power to develop new solutions for professional problems or even the power to develop new problem solving methods. Hatano and Inagaki suggest three factors enhancing the development of adaptivity: 1) a random context that forces professionals to adapt their skills, based on careful observation and interaction; 2) a safe environment where rewards are not depending on performances; 3) a working context which values quality more than efficiency. According to Feltovich, Spiro and Coulson (1997) adaptivity is trainable by developing a growth mindset instead of a fixed mindset. Schwartz, Lindgren and Lewis (2009) suggest to let students experience innovative trajectories before they learn formalised protocols and routines. Authors like Mercier and Higgins (2013) and Verschaffel et al. (2009) state that adaptive expertise can be enhanced by creating a learning context in which students are challenged to interact with concepts and materials and to test their misconceptions in a safe environment.

4. Organising learning for students and professionals in the workplace

Traditionally, higher education is mainly relying on the application model of transfer. But as new knowledge and insights are growing exponentially and professions are changing rapidly, this approach will not be sufficient for preparing students for their future work. Future professionals should be able to adapt to new knowledge and insights and contribute to new knowledge creation. This adaptive expertise can be stimulated in several ways as mentioned in the former section. It asks for flexible learning trajectories, individualized learning paths, and a constant adaptation to what is happening in the professional working environment.

A substantial part of the professional training takes place in the working environment where novice students are supervised by expert professionals. From our research in health education we know that these professionals predominantly have a focus on developing routine expertise (through an application model for transfer) and fixed mindsets (Duitsman, 2019). Insight in how to develop educational programs where adaptive expertise is a fundamental element of the curriculum, is needed. In these curricula the (informal) learning in the workplace and the formal learning in school are closely intertwined. Educational developers are looking for (evidence-based) ways to stimulate adaptive expertise development. Work-based programs should combine the more traditional novice-expert model with more open and ill-structured workplace problems in order to enhance adaptive skills and expertise development (cf. case-based reasoning in engineering contexts). For this, Tynjälä (2008) promotes the connective model of workplace learning. The connective model, makes a reflexive connection between formal and informal learning, and vertical and horizontal learning. Through working

collaboratively students develop poly-contextual and connective skills which enables boundary crossing by students, that is the ability to work in changing and new contexts. This implies that learning in work environments must be seen as a holistic process, in which theory and practice are not separated from each other. Furthermore, students solve real life problems in authentic working life contexts. There should be a deep integration of theoretical, practical and self-regulative knowledge in order to create expertise.

Glazer & Hannafin (2006) propose for teacher training a collaborative apprenticeship model featuring reciprocal interactions as an approach to promote professional development, encouraging peer-teachers to serve as modelers and coaches of strategies and ideas aimed at improving instruction. Students contribute new ideas to their learning environment and become future mentors in order to sustain skills and strategies across a community of professionals. This means that the role of the expert needs to be redefined. He/she is expert and lifelong learner and can also learn from the novice or the student. However, a paradox is emerging, because experts are also assessors of the student professionals. . The traditional hierarchic relation will be challenged, as in many working environments mutual learning, speak up, upward feedback and more open relationships are not self-evident. Psychological safety for both professionals and students is a basic requirement. Psychological safety is identified as a critical factor in understanding phenomena as voice, teamwork and team learning. Edmondson (2014) concludes in her review study that a climate of psychological safety can mitigate the interpersonal risks inherent in learning in hierarchies. People are more likely to offer ideas, admit mistakes, ask for help, or provide feedback. Individuals who experience greater psychological safety are more likely to speak up at work. Upward communication can be vital force in helping organizations learn and succeed.

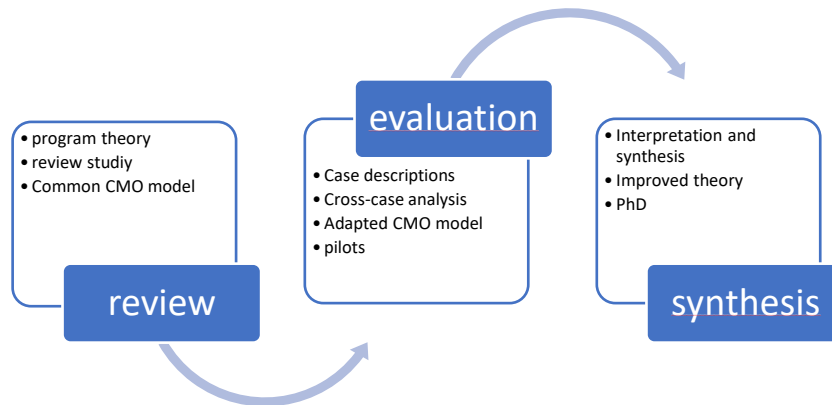
The introduction of EPA's in medical education can be seen as a way to shape this expertise developmental process, which is also relevant for other professional domains. However, at this moment knowledge how to create and implement this kind of curricula and understanding what works why and under what conditions is scarce. This leads us to the following broad research question: How can we stimulate the development of adaptive expertise during workplace learning? We will focus on the learning of (future) professionals in the workplace, asking what mechanisms occur that lead to adaptive expertise development, and what contexts shape the operation of these mechanisms and the outcomes they produce.

The collaboration in the consortium should lead to sharing educational expertise and experiences, to new insights and educational formats and contribute to further theoretical foundation. By this the research question will be focused and specified. We strive to have a broad consortium with educational researchers from different professional fields (including ourselves). Our consortium partners should be at a position where they can organize pilot studies in existing curricula.

5. Towards an applied research proposal

We have chosen for a combination of design-based research (DBR) and comparative research. Characteristic for DBR is the systematic study of designing, developing and evaluating educational interventions as solutions for complex problems in educational practice. This also aims at advancing knowledge about the characteristics of these interventions and the processes of designing and developing them. Educators and educationalists have an active role in the design, implementation and redesign of the interventions, in order to formulate robust design principles that can be applied in other environments. Within this DBR we take a realist approach, as we are not looking for 'golden standard' or 'the best way' to implement an educational intervention. Rather we want to unpack mechanisms of how complex programs work or why they fail in particular contexts and settings.

We structured our research program into 3 phases:



Phase 1 is a realist inspired review of literature , resulting in a program theory in use of the consortium partners for effective professional education for an uncertain future. How can a traditional reproductive novice-expert model be combined with a knowledge-creating model, in which students (and teachers and professionals) are confronted with ill-structured workplace problems? Which educational tools help students to work and learn in a constructive transfer model (such as the case-based reasoning model) and how does this inflict the entrustment processes which are crucial for the admittance to professional practice? The theories-in-use of the consortium partners are point of departure for this exercise.

In phase 2 the program theory is used by consortium partners to perform a realist inspired case study in their own context resulting in evidence-informed assessment of the underlying educational models. The design of the case studies will be developed collaboratively. Working with a design-based approach, in which specific building blocks will be elaborated towards improvement options for the partners' programs: testing of these options in small-scaled try-outs will give the opportunity to deepening the insights in feasibility and evidence of the theoretical assumptions. Being it unrealistic to develop and implement complete innovative educational programs, the comparative approach and the small-scaled pilots will deliver evidence for the program theory.

During phase 3 (realist evaluation) we focus on a synthesis of our findings of consortium partners, resulting in theoretical and practical implications of the projects' results. Conclusions and recommendations for the educational practice at the UR's and UAS's and for the lifelong development programs in various professional domains will be formulated.

For these 3 phases we plan 3 years, during which a post-doc researcher and partner researchers will collaborate. An accompanying PhD study will be established to enhance scientific output, next to the practice-oriented outputs of the realist approach. A 4th year will be used for the PhD to write and finish her/his thesis and to wrap up results for educational practice.

6. The output of the project

Based on the outlines in our essay, we expect to deliver to following outcomes of the project:

- theoretical and practical insights in how to create adaptive learning interventions
- recommendations for the educational practice at the UR's and UAS's for developing flexible expertise in various professional domains.
- Four scientific articles leading to a PhD
- A multidisciplinary research network on adaptive learning - An international symposium after three years.

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