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DIGITALIZATION OF HEALTHCARE PRACTICE
CHANGING MEDIA, EVOLVING LANGUAGE GAMES

EMANUELA MARCHETTI
AND CAMILLA KØLSEN PETERSEN

CORRESPONDING AUTHOR: EMANUELA MARCHETTI, ASSOCIATE PROFESSOR AT THE DEPARTMENT FOR THE STUDY OF CULTURE, UNIVERSITY OF SOUTHERN DENMARK. EMAIL: EMANUELA@SDU.DK

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LANGUAGE GAMES, PRAGMATIC CONSTRUCTIVISM, DIGITALIZATION, SIMULATIONS, PARTICIPATORY DESIGN, HEALTHCARE EDUCATION, OCCUPATIONAL THERAPY

ABSTRACT

THE HEALTHCARE SECTOR HAS ENTERED AN ECOLOGICAL EVOLUTION, A SYSTEMIC CHANGE CAUSED BY THE INTRODUCTION OF NEW TECHNOLOGY AND FINANCIAL CUTS, WHICH IS DEEPLY TRANSFORMING EXISTING PRACTICES IN RELATION TO SKILLS AND VALUES (NARDI & O'DAY, 1999). CONDUCTING A PARTICIPATORY DESIGN PROCESS, AIMED AT THE DEVELOPMENT OF A DIGITAL SIMULATION FOR THE EDUCATION OF OCCUPATIONAL THERAPY, WE FOUND THAT THE ONGOING DIGITALIZATION IS CHANGING EDUCATIONAL AND WORKING PRACTICES, CHALLENGING THE PROFESSIONAL IDENTITY OF THERAPISTS AND GRADUATE STUDENTS, BUT ALSO INTRODUCING NEW PROFESSIONAL OPPORTUNITIES.

WE USE A PRAGMATIC CONSTRUCTIVIST PERSPECTIVE ON LANGUAGE GAMES DEFINED AS A COLLABORATIVE CONSTRUCTION OF OUR WORLD THROUGH ACTION AND COMMUNICATION THAT FULFIL OUR PURPOSES IN HUMAN PRACTICE. OCCUPATIONAL THERAPY EMERGES AS A PROFESSION IN FLUX AS THERAPISTS MUST MOVE FROM THEIR TRADITIONAL ROLE AS HEALERS TO RETHINK THEMSELVES AS FREELANCERS OR EMPLOYED IN THE PRIVATE SECTOR. WE IDENTIFIED FOUR DIFFERENT LANGUAGE GAMES, WHICH ARTICULATE HOW THERAPISTS MUST RETHINK THEIR PROFESSIONAL IDENTITY AND PURPOSEFUL PRACTICE IN RELATION TO EMERGING WORKING CONTEXTS AND RELATIONSHIP TO THE PATIENTS.

AUTHOR BIOGRAPHIES

DR EMANUELA MARCHETTI, EMANUELA@SDU.DK | ORCID: 0000-0002-7949-9953, IS AN ASSOCIATE PROFESSOR IN MEDIA STUDIES AT THE DEPARTMENT FOR THE STUDY OF CULTURE, UNIVERSITY OF SOUTHERN DENMARK. HER RESEARCH FOCUSES ON THE DIGITALIZATION OF EDUCATION AND SKILLED PRACTICE, THROUGH PARTICIPATORY DESIGN INTERVENTIONS, FROM THE PERSPECTIVE OF THE INDIVIDUALS AND THE INSTITUTIONS INVOLVED. FROM A THEORETICAL PERSPECTIVE, HER MAIN INTEREST LAYS IN SOCIOMATERIALITY, DESIGN, AND PLAY, AS A CULTURAL AND EPISTEMIC PRACTICE.

DR CAMILLA KØLSEN PETERSEN, CKP@MGMT.AU.DK ORCID: 0000-0002-7165-527X, IS AN ASSOCIATE PROFESSOR AT DEPARTMENT OF MANAGEMENT, AARHUS-BSS, AU. RESEARCH INTERESTS ARE DIGITALISATION PROCESSES IN COMPANIES AND THE EDUCATIONAL SECTOR, PROJECT MANAGEMENT, LEARNING IN PRACTICE AND COMPUTATIONAL THINKING. CAMILLA CONDUCTS RESEARCH WITH BOTH QUALITATIVE AND QUANTITATIVE DATA, METHODS AND TOOLS. CAMILLA HAS BEEN AN EDUCATIONAL RESEARCHER AT SDU, AND WORKED 10 YEARS AS A LAB-MANAGER FOR THE PEOPLE, TECHNOLOGY, AND BUSINESS-LAB AT THE ALEXANDRA INSTITUTE.

Introduction

An ongoing digitalization process, associated with financial cuts, is leading to an ecological evolution in the healthcare sector, defined as a systemic transformation (Nardi & O'Day, 1999) altering practices, values, and introducing unintended consequences for healthcare professionals and patients. Current studies acknowledge an increasing integration of digital technologies in Occupational Therapy (OT) (Bennet et al., 2017), but do not discuss how this is affecting professional practice and its actors.

We conducted a participatory design process, aimed at designing a digital simulation to support learning of OT practice at higher education institutions in Denmark, and we were confronted with the overwhelming impact of the ongoing digitalization on OT practice and education. We found that OT education in Denmark is being challenged by a reformulation of roles and duties in the profession, for which the ongoing digitalization process is one prevalent driver.

We aim at analyzing how this evolution is affecting OT education and practice, using a pragmatic constructivist analytical perspective on Wittgenstein's theory of language games (Kure et al., 2019; Nørreklit, 2011, 2020; Wittgenstein, 1958), where language games are seen as collaborative creation of meaning functional to our purposes in specific contexts and practices. This provides us with an ontology for understanding actors' constructions of functioning practices (Kure et al., 2019), which is aligned with the theory of language games (Nørreklit, 2020), and a foundation for our identification and analysis of emerging language games in OT education and practice. In other words, this pragmatic constructivist perspective on language games can help us to articulate the initial observed reformulations of how teachers and students engage in learning practices, aimed at professional OT practice and its emerging language games. We have chosen language games in a pragmatic constructivist perspective for our study because we want to identify and analyze the purposeful changes in OT communication and action in the interacting field of education and practice.

Our research question is articulated in two parts:

1) *How is the ongoing digitalization affecting the professional language games of Occupational Therapy?*
2) *What are the implications for Occupational Therapy education?*

To address these two research questions, we conducted a research through design inquiry (Zimmerman & Forlizzi, 2014), targeting the design of a digital learning environment for OT education, which we call *ErgoWorld*. Our design process was in fact aimed at gaining an understanding about how ongoing digitization is affecting professional values and identities in the healthcare sector and education, focusing on the OT education as a specific case-study. We followed a participatory design methodology (Björgvinsson et al., 2010), actively involving groups of students, teachers, educational leaders, organizations and companies, and representatives from the OT union in the conceptualization and testing of prototypes. Our process started with an ethnographic user study, as we gathered qualitative data on the digitalization of OT through observation of practice, interviews, co-creational workshops and co-created material. We began our analysis aiming at providing a valuable tool, the ErgoWorld-prototype, to uncover and support the needs of OT-students and teachers. We conducted a thematic analysis on video recordings gathered from in-situ observations and co-design workshops, and we realized that a central outcome of our study is the identification of the emerging language games and their implications for OT education and professional identity. For the sake of our study, we define professional identity as a social construct, derived from participation in an ecology of practice and producing social differentiation, based on acquired skills, knowledge and values (Bhabha, 1994; Hall, 1996). Due to this shift in perspective, the prototype and our design process are both described as part of our analysis of language games, as these provide a source of data for our analysis.

The operationalized framework for our analysis is described in the theory section and it is based on Wittgenstein's theory on language games, seen from a pragmatic constructivist perspective (Nørreklit, 2020). We interpret teachers and students as actors in OT educational ecology, and we shortly comment on this position. We delimit OT education as an integrated ecology (Nardi & O'Day, 1999), defined as the assemblage of actors, artifacts, practices, and distinctive values belonging to multiple contexts of practice and constituting OT as a discipline to be learned. Within the OT ecology, different language games are enacted in different contexts to coordinate and fulfil different pragmatic purposes for the ecology's actors.

In this article, we discuss the identified language games and their implications for education and practice.

Theoretical foundations – Language games and ecological evolution of OT

It can be argued that Wittgenstein's theory of language games does not embody a clear qualitative methodology. To make a methodology for our analysis of OT's language games, we therefore use a *pragmatic constructivist perspective on language games* (Jakobsen et al., 2011; Kure et al, 2019; Mitchell & Nørreklit, 2019; Nørreklit, 2011, 2020; Nørreklit & Trenca, 2019). We will be using this qualitative methodology to analyze data from our design inquiry, trying to identify and describe the changes of both action and communication in OT practice.

The theory section is in two main parts. The first focusing on both the definition of *language games* and how they can be seen as a meaningful collaborative reality construction from a *pragmatic constructivism* perspective. The second part focusing on our operationalisation of theory into a framework for analyzing language games in the setting of a design process targeting OT education.

What are language games?

In his §7 in *Philosophical Investigations* Wittgenstein writes: "*We can also think of the whole process of using words (§2) as one of those games by means of which children can learn their native language. I will call these games 'language games".* Language games cover a whole range of activities: *"(...) the whole, consisting of language and the activities into which it is woven, a 'language game'"* (Wittgenstein, 1958, §7). What we say, how we say it, and what we think it means is then pragmatically and maybe also aesthetically locked into our human experience of phenomena and actions in the world. In this respect, language games are always changing, as the meaning of words are defined by the actors' communication with each other. In Wittgenstein's own words: "*(...) the meaning of a word is its use in the language*" (Wittgenstein, 1958, § 43). However, Wittgenstein has no account of exactly what features of use are necessary for an expression to have a given meaning (Child, 2011, p. 103). Wittgenstein writes of facts from experience as embedded in the language game itself, and these facts can always change as new and different experiences may take place. Due to this, language games are unpredictable and 'just there' like life (Wittgenstein, 1969, §558, §559, §564).

Language games in a pragmatic constructivist perspective

While the methodological approach of language games in a pragmatic constructivist perspective is also used in other fields of research (Jakobsen et al, 2011; Kure et al., 2019; Mitchell & Nørreklit, 2019; Nørreklit, 2011; Nørreklit & Trenca, 2019), we want to make its use clear in our study.

We begin with an example. Lennart Nørreklit (2020) uses 'the apple language game' from the opening paragraph in Wittgenstein's Philosophical Investigations to create a pragmatic constructivist perspective on language games (Nørreklit, 2020, p. 11):*"In the Apple-game a mother asks her boy to go and buy 5 red apples at the grocery. She gives him a sheet of paper on which she has written "5 red apples" which he is supposed to give to the grocer."* In this language game, Nørreklit states that if the boy goes to buy the apples, then the mother and the boy understand each other, and if the grocer sells the apples, then the boy and the grocer also understand each other (Nørreklit, 2020, p. 15). The appropriate responses in the interplay of the actors in the apple-game are then *pragmatic* criteria for understanding the language game well enough to play it (Nørreklit, 2020, p. 15). As actors, we have different purposes in the language games, through which we try to understand each other and fulfil our purposes, e.g. getting, buying or selling apples. Summarizing, the pragmatic constructivist view on language games focuses on analyzing how we *collaboratively construct* the world through action and communication that fulfil our purposes, for instance as OT professionals or as sons, mothers and grocers.

This example shows that the pragmatic results of our actions are created through construction of integrated frameworks of reality in the language games the actors participate in. "*Reality is called an integrated construct because the condition for the functioning of a construct is the integration of the four dimensions of facts, possibility, value and communication. Success is caused by integration, while problems and failure are caused by lack of integration"* (Nørreklit, 2011, p. 17). In the "apple

language game", the participating actors construct integrated frameworks of reality collaboratively as each actor provides an appropriate answer to another actor's action or communication and still pursue his or her own purpose in the overall apple language game. Using the four dimensions of reality involved in language games, the language games themselves can be analyzed with a transparent research methodology.

Therefore, we proceed with elaborating on the four dimensions of reality *facts, possibilities, value and communication,* as they are our analytical dimensions to analyze and identify language games.

Language games in OT education: An analytical framework

Facts, possibilities, value and communication make up the functioning practice of actors participating in language games. These four dimensions serve to illustrate how pragmatic constructivism lends a possible methodological approach to analyzing language games, in accordance to Wittgenstein's notion of language games, as illustrated in Table 1[1]. In other words, facts, possibilities and values are integrated into the actor's communication and action in the language games (Nørreklit, 2020, p. 12).

For our purposes in this analysis, we lean on the existing theoretical work on the facts-dimension and on the other three dimensions of possibilities, values and communication as well (Jakobsen et al., 2011; Nørreklit, 2020, 2011). In this respect, we refer to '**facts**' as the dimension that describes how the actors perceive things and relations of the world, e.g. how words and ideas refer to the world in a language game. This is related to the "*factual conditions our actors are acting in*" (Nørreklit, 2020). The meaning created in communication through language games is knowledge of *when* to say what (Husted, 1989). Building on the pragmatic criteria for understanding the apple-game (Nørreklit, 2020), if we as actors each fulfil our purpose in the game (mother getting apples, boy buying apples, and grocer selling apples), then the actors in collaboration have constructed something real that refers to a world that is not an inner world for each actor. The pragmatic focus is on the effects or consequences of our actions (Child, 2011, p. 97) in relation to our purposes. The knowledge of how to communicate and act, e.g. 'buy' and 'sell', can be reused in other familiar situations *as the language games make up 'families'* (Wittgenstein, 1958, §66-67). In our analysis, we are looking for families of language games in the OT practices, where the actors' purpose is to construct effective therapies that can heal the patient.

The second dimension is '**possibilities**' for acting and communicating available to each actor in a language game. The possibilities we have, depend on our understanding of what the factual conditions are in the language game, and is our '*reflections to identify relevant possibilities determined by the facts*' (Nørreklit, 2011, p. 21) in the language game. For example, possibilities in a profession: "*For the doctor this means that he knows the possible treatment, and is able to perform or recommend high quality treatment*" (Nørreklit, 2011, p. 21). Language games may presuppose obligations or duties that also shape our possibilities to access a certain language game, which in turn implies actors to accept the obligation to play available roles (Nørreklit, 2020). This aspect is especially important when analyzing professional practices.

Due to the constant change of language games through action and communication, '**factual possibilities**' (Nørreklit, 2020) can be many different possibilities, and what actually happens in a language game depends on the third dimension: '**values**'. Values determine how the actors need to be motivated to act. For instance, the mother needs to motivate the boy to get the apples for her, based on her knowledge of what motivates him: the boy's values (Nørreklit, 2020). If there are no values present to act upon, then nothing will happen (Nørreklit, 2011, 2020). In our analysis, we align the values dimension to the professional focus of the language games, for instance the values of healing and helping others for an occupational therapist in the context of their work.

Finally, '**communication**' is necessary for actors to cooperate. Communication and action integrate all dimensions into the flow of the language game, and may lead the actors to their intended result; the mother is getting the apples for her dessert because the boy buys them at the grocer who sells them. If the actors in the language game understand each other and interact on the factual possibilities related to their values and/or duties and obligations in the language game, they can coordinate practice and fulfil their intentions. Failures may of course occur, but in the functioning cooperation based on integration of the four dimensions "(...) *it means that activities can be controlled in a way that is likely to lead to results, and that the actors are able to learn from failures. If on the other hand, the actor-world relation is constructed in an invalid way, then learning from failure does not improve the results.*" (Nørreklit, 2011, p. 23).

Building on language games from a pragmatic constructivist perspective, we see OT teachers and students as actors, who continuously and collaboratively construct their functioning practice of learning within their educational ecology. Hence, referring to an ecological perspective, we see education as the ecology of cooperation between teachers and students, who in the educational ecology construct and rehearse language games that the students must acquire to function in their professional practice. Education as ecology is a situated entanglement (Nardi & O'Day, 1999), defined by artifacts, languages and practices, constituting factual conditions for preparing the students to participate in pragmatically valid actions for the profession. The students and teachers are responsible for creating pragmatically meaningful content in the education, while being under the influences of society and the targeted profession, in this case OT currently affected among other things by the digitalization process.

We see the emerging professional language games identified in this study, as new games to be included in the cooperation of the teachers and students in OT education. The factual knowledge embodied in these language games constitutes content to be integrated with capability to act, based on a competent and evolving understanding of factual possibilities, hence contributing to the development of students into competent professionals.

Methodology – A participatory design perspective on healthcare digitalization

In this section, we present our participatory design inquiry, illustrated in Table 1, and our analytical methodology.

Design phase	Participants and number	Data sources and format
User studies utilizing ethnographic methods	59 students, 7 teachers	Notes and video material
Preparation of co-design in two workshops	Interview with 3 representatives from the OT union 5 students, 4 teachers, 2 union representatives, 2 representatives each from 2 companies	Video and various written materials and prototype
Prototyping and Test	6 students, 1 teacher	Notes and video material

Table 1 *Empirical study*

Based on the analytical framework formulated in the theory section (see Table 2 below), we conducted a qualitative analysis of our empirical data. We organized our analysis following the design process; this means that our analysis of OT language games occurred through a series of three iterations and the design phases related to each iteration, as discussed in the following section.

Participatory design inquiry

Our study was conducted as a research-through-design inquiry (Zimmerman & Forlizzi, 2014), based on a participatory design qualitative methodology (Björgvinsson et al., 2010). This means that we engaged in the design of a digital simulation, aimed at enriching learning practice in OT education, with the purpose of gaining knowledge on how the ongoing digitization and other related societal trends such as innovation and privatization were impacting the healthcare sector regarding values and professional identities. We actively involved teachers, students and professionals as co-designers in co-design workshops so that they could provide insights on their challenges and suggest new scenarios for their future practice. Participatory design embodies a political agenda of democratizing the creation of technologies for people, approaching them as experts in their practice and co-designers, able to contribute to the design process (Sanders, 2002). At the same time, we see our participatory

design process as an opportunity for our involved actors to concretize their challenges and worries regarding the digitization and development of their professional future, by discussing features and use-cases of an actual new digital artifact.

Our design process included three main iterations, each articulated through four stages: user study applying ethnographic methods, co-design workshops, prototyping and testing. This was overall a research process combining design methods and ethnographic methods. During the user study, we interviewed representatives of the union, and observed learning activities: at bachelor level in Odense and Copenhagen, at internship level at Odense University Hospital, and at Master's level in Odense. When possible, we conducted forms of video ethnography (Pink, 2006) and otherwise we took notes and sketches for documentation. During the user study, we gathered data on educational challenges in general and more specifically in relation to the ecological evolution affecting OT practice.

During each workshop, the participants were placed in three groups, and were invited to engage in collaborative sketching activities. During the first workshop, we introduced three user scenarios (Figure 1) that we envisioned for the ErgoWorld simulation.

Figure 1 *Sketches of learning scenarios provided during workshop 1.*

The leftmost scenario shows students engaging with the simulation and with books, in order to foster reflections in the participants about *how to connect theoretical models and practice in the simulation*. The middle scenario shows students engaged in *mediated role-playing*, to foster reflections on how role-play is currently contributing to strengthen practical skills. On the right, the *analytical writing* scenario is shown which is aimed at fostering a discussion on a discussion on how to integrate in the tool the practice of keeping a professional journal with the practice of the to record clinical dialogue. These scenarios provided a main reference for the participants to reflect on educational and professional challenges.

During the second workshop, we provided templates for sketching ideas for a desktop and a mobile version of the simulation (Figure 2), building on the scenarios and results from the first workshop.

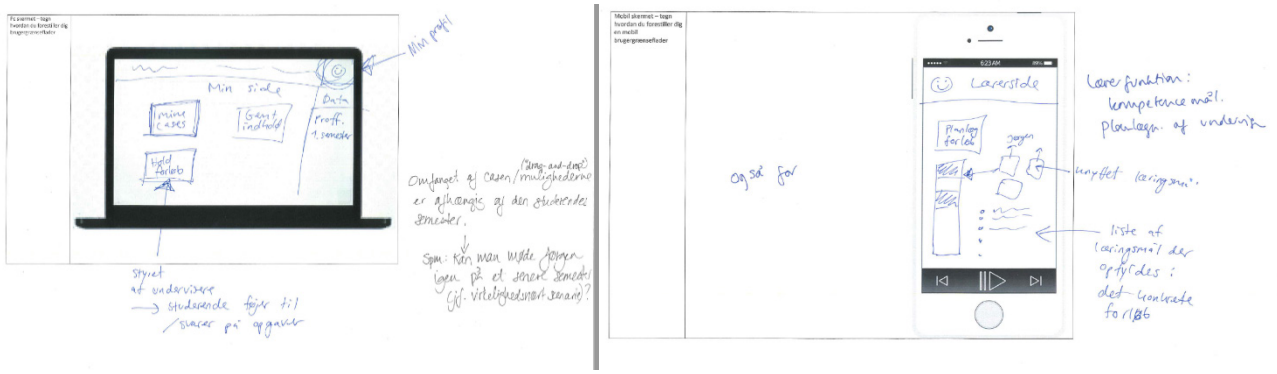

Figure 2 *Template for sketching of prototypes provided during workshop 2.*

Through both workshops, we gained additional insights into how the digitalization process was altering OT practice in relation to facts, possibilities, values and communication among actors, from the participants' perspective, hence integrating initial data gathered through the ethnographic observations and interviews conducted in the beginning of the process.

As a follow up from the workshops, we created a few prototypes and a final digital prototype, which was tested in Odense with a focus group consisting of six students and one teacher: the prototype is presented in the following section.[2]

Operationalization of our analytical framework

In our analysis, we aimed at identifying and classifying emergent language games in OT practice and education, based on data from our design process. We looked for 'families' of language games, as patterns across the observed communication through our design phases. A family of language games is identified when more language games relate to the same professional situation for a single therapist, e.g. language games show likeness across the four dimensions of facts, possibilities, values and communication.

Table 2 shows our operationalised framework for analysis. We have constructed it using the four dimensions for analyzing language games from the pragmatic constructivist perspective. We have provided examples from both the 'apple-language game' discussed in the theory section and the operationalization of our analysis of OT-language games.

Pragmatic Constructivist-Dimension	**Apple-language game, based on Nørreklit (2020)**	**OT-language games; operationalization of our identification of families of language games**
Factual knowledge	The boy needs to have factual knowledge of the way to the grocer, and he needs to be capable to go there, know what apples are, a grocer etc.	Factual knowledge of the conditions and actors where the language games takes place, for instance the hospital context Capability to perform the actions and communication in the actualized context for the language games
(Factual) possibilities	The mother needs to know that the boy can make it to the grocer and interact with the grocer based on the note	Who are the actors in the language games besides the OT-professionals? Obligations, duties and purposes of OT-actors? Professional and dutiful interaction with other actors based on factual knowledge, the OT's own understanding of her role
Values	The mother needs to motivate the boy to go, and the boy must trust the mother to go	Professional focus of the language games Educational or professional values related to for instance clinical writing, clinical dialogue for healing, therapy, mediation of actors, involvement of actors and the purposeful results hereof for the actors involved, for instance well-being of citizens
Communication	The boy needs to know that the mother needs 5 apples, so she asks him and gives him the note and the money – and then he sets off	The different methods for dialogue with actors, the ability to perform the dialogues and communication based on integration of factual possibilities and values

Table 2 *Operationalization of analysis.*

By using this framework in the different phases of our design process, we identified the language games used by our participants in the different areas of the OT ecology that the design process engaged. Both authors carried out the analytical process in an iterative manner, going back and forth between the actual data and the operationalization of families of language games. We were looking for facts, possibilities, values and communication as patterns of similarity in the data to identify and understand language games going on, but we did not know up front which families of language games we would actually find. For instance,

we identified the 'clinical' OT language games analyzing data from our user studies; the 'commercial' and 'administrative' language games we identified through discussions with teachers and union representatives during our user studies and co-design workshops.

Analysis of empirical data

We structured the analysis of our design processes in three parts, focusing on the data we gained regarding: 1) Clinical OT language game, 2) Prototyping and testing, 3) Emerging OT language games.

Clinical OT language game

In contrast to other healthcare professionals, like physiotherapists and doctors, who work in a medical studio, OT practice occurs in the living ecologies of the patients (Marchetti & Petersen, 2019), defined as the assemblages of humans, artifacts, practices, routines and values within which the patients act every day (Nardi & O'Day, 1999). As the therapists access the living ecologies of the patients, the two co-construct a mutual language game, enabling them to engage in the so-called *clinical dialogue*, a form of verbal and bodily communication (Figure 3) aimed at discussing the patient's condition. We interpret the clinical dialogue as the native language games in OT and a central learning goal in OT education. During the clinical dialogue, the therapists apply theoretical models to assess the patient's condition. A widely used model in Denmark is for instance *MOHO*, The Model of Human Occupation (Kielhofner, 1995), which provides an analytical framework to formulate personalized therapies for patients.

During observations with a student intern (Figure 3), she and her supervisor showed us how the clinical dialogue is practiced with a patient recovering from a stroke. The intern carefully observed, held, and guided the body of the patient while performing daily tasks, such as personal hygiene, cooking or hobbies. The purpose is to discover when pain occurs and how to readjust daily activities to avoid pain, and to support muscular and cognitive rehabilitation. The intern also initiated a series of coordination games, challenging the patient to raise and lower his hands to reach hers. Afterwards she was sensing the patient's arm to check muscular tension and pain (Figure 3). Analytically seen, the intern is, through the clinical dialogue, collecting factual knowledge on the needs of the patient which outlines the factual possibilities for therapy for the patient. Using the professional values of OT (seen for instance in MOHO), the intern carries out the clinical dialogue with both the patient in the observed situation and afterwards in communicating the therapy. Both language games are in family, showing integration of factual possibilities and values for healing the patient, which is also the pragmatic purpose of these language games.

Figure 3 *Intern sensing the arm of a patient recovering from stroke. Sketch from the authors.*

During classes at bachelor level, we observed the students engaging in role-play in pairs to enact and explore the construction of the clinical dialogue, playing the roles of patients and therapists. The main challenge for the students is to learn how to master clinical reasoning (Mattingly & Fleming, 1994), involving: interviewing techniques and embodied forms of communication, while applying theoretical models to specific situations. Role-play constitutes training for the students' factual knowledge of and capabilities for the clinical language games. We analyze this as a way to teach the students the clinical dialogue as a family of language games, where each game is contextualized in relation to the individual patients and lasting for the time of therapy (Marchetti & Petersen, 2019). Hence clinical language games change over time as one language game leads to the next, and students are re-learning new words to address the needs of new individual patients.

We observed role-playing students in class, trying out techniques to enable patients recovering from a stroke to swallow fluids and eat. The students showed embarrassment, giggling at each other, while one was holding the head of the other, especially in mixed gender pairs. In other cases, they tried multiple times to find a comfortable position for the hands of the therapist-student on the patient-student, expressing ironic comments such as: "Help, my therapist is choking me!" or "Careful, I am choking!". These interactions may help students learn their duties and factual possibilities in the clinical dialogue with patients, and how to coordinate this practice in alignment with their professional values.

Another language game in the clinical dialogue family is *clinical writing*, an annotation practice similar to ethnography, enabling therapists to write a profile of the patients to be shared with other healthcare professionals (Jacobs et al., 2016). We see clinical writing as the written transposition of the clinical dialogue and as the core of intra-professional coordination of practice. Therapists translate the integrated and informal communication with the patient into a formal and written communication to be shared in language games with other healthcare professionals, to facilitate coordination of factual possibilities for therapy for the patient. Through translation, the therapist is establishing the link to the professional values, since they are stating in clinical writing how the theoretical concepts and their embedded values refer to the factual possibilities of the patient.

Prototyping and testing

We present here our tested prototype: a point-and-click game (Figures 4 and 5), simulating the practice of OT as an integrated system of ecologies (Nardi & O'Day, 1999), defined by their specific language game, framed within the local community of reference and visualized through a series of buildings. The start screen (Figure 4) shows Odense University Hospital (top right), the municipality (right underneath the hospital) and the home of individual patients.

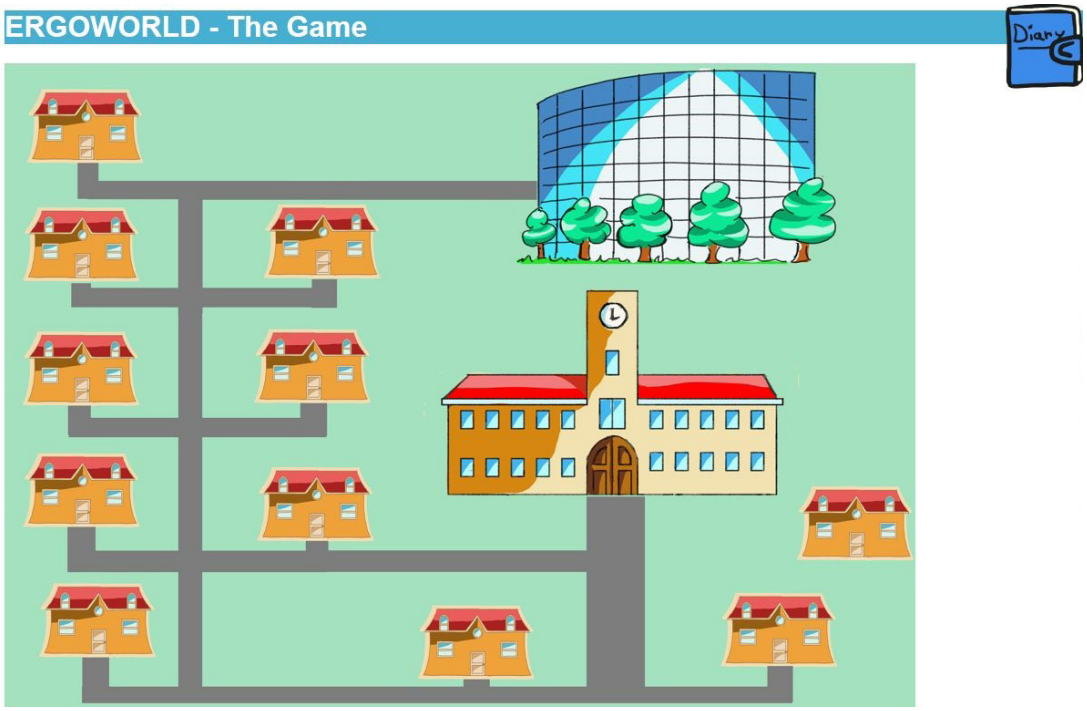

Figure 4
Start screen of the ErgoWorld final prototype, with minimized diary on the top-right side.

The ambition of ErgoWorld is to provide the students with a sand-box environment for trying out different language games in the profession, as integration to role-play in class, and training their capabilities and factual knowledge of the various language games and the related values. Different clinical situations are represented in a simple comic strip style, so that teachers and students should be able to create and share their own stories (Figure 5).

Figure 5
Visualisation of different clinical situations: an old man and a young girl acting in the same kitchen.

A virtual diary is displayed in a minimized format on the start screen (Figure 4), which the students can click to take notes on the patients' needs, symptoms and therapy based on the MOHO model (Figure 6). This diary function attempts to bridge the practice of the informal and the formal; written clinical language games addressed to patients and other healthcare professionals respectively.

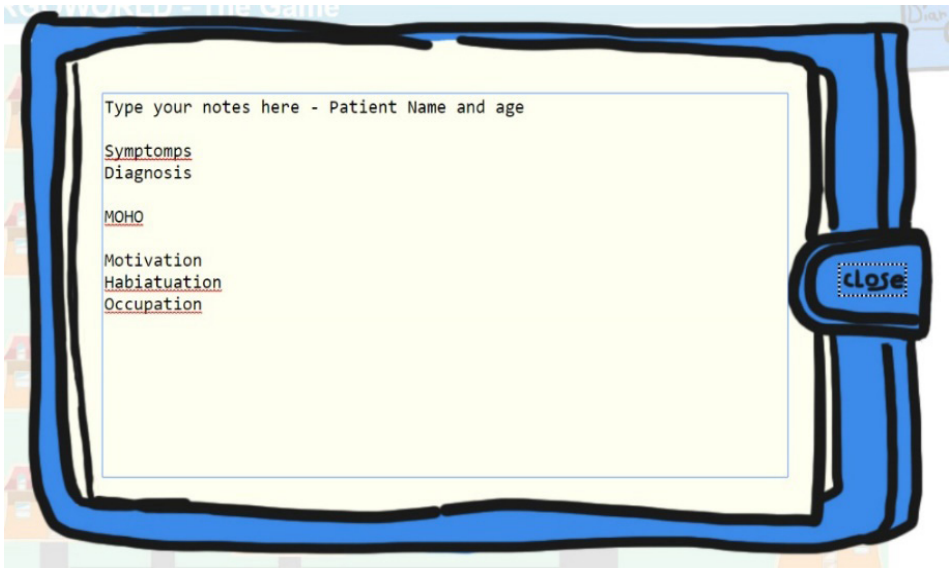

Figure 6
Virtual diary maximized.

Our prototype was formulated during the co-design workshops and tested with a small focus group, including six students and their teacher. The students found the buildings-based representation "effective" in concretizing core practices (language games) of OT. One student said: "It could make role-play feel more real" or "less arbitrary" as confirmed by her classmate. The teacher argued that the start-screen could foster a "concrete dialogue on the development of the healthcare sector." She continued: "Nowadays students are facing harder challenges, they need to be ready to look for other opportunities than clinical employment. But luckily there is a need for them, also in companies." In our analysis, we see this as an indication of how interaction with ErgoWorld could facilitate students' learning of factual knowledge and possibilities of their future practice and roles within their community.

In conclusion, ErgoWorld is intended as a participatory learning tool for teachers and students, an artifact contributing to

the educational language games facilitating and coordinating the existing and new dialogues for OT practitioners, like the note in the apple-language game.

Emergent OT language games

During an interview, representatives of the Danish OT union explained to us that the ongoing digitalization, and recent financial cuts to the healthcare sector, have caused a reduction of clinical jobs within hospitals and the municipality. According to the head of the union: "There won't be enough jobs for all the graduates!" She also said that the students "must be aware of the challenges" that await them and "be creative (...) to find other jobs, eventually as freelancers." During ethnographic observations a teacher argued that OT students: "See themselves as "healers", "they want to help others," but she confirmed that: "Nowadays students must rethink themselves!".

However, the ongoing digitalization has also led to new employment opportunities. Union representatives mentioned that IT-companies are hiring healthcare professionals as consultants, contributing to product development (tools for rehabilitation or ergonomic furniture) and marketing strategies. The head of the union added that similar opportunities are emerging also in the municipality, where: "OT professionals can act as consultants, for deciding which aids to purchase for individual citizens and local institutions". Working in IT-companies, freelancing or in the public administration constitute in our analysis new factual possibilities for graduates, based on different factual knowledge, values and motivations than healing a patient. Based on our analytical framework, this will lead to different language games, as the factual conditions and actors differ from the clinical language games. A question emerges regarding if it is the students' responsibility to rethink their identity, or if and how they should be supported by their education.

As a result of the analysis, we have identified *four* language games emerging in OT practice, called:

1) Clinical - the 'native' language games, articulated through the clinical dialogue and clinical writing,
2) Commercial,
3) IT-innovation,
4) Public administration.

The last three represent emergent language games, related to new factual knowledge, possibilities and values leading to new career paths and professional identities for OT professionals. We elaborate these emerging language games as part of the discussion.

Discussion – Language Games and OT: a profession in flux

Current studies argue that digital technologies are being increasingly integrated in OT, evaluating different tools and simulations (Bennet et al., 2017; Jacobs et al., 2016); however, insights are missing regarding the impact of the ongoing digitalization on OT practice.

Our study shows that the ongoing digitalization of OT, combined with financial cuts, is causing an ecological evolution to practice and education, revealed by changes in their language games. This evolution is defined as a systemic change (Nardi and O'Day, 1999), as the introduction of digital technologies in OT is altering factual knowledge, possibilities, and values for OT language games, at the same time facilitating coordination of practice, creating new roles and relationships for actors. As a result of our analysis, current professional identities are being challenged to embrace other language games than the family of clinical language games.

Table 3 sums up the four identified families of language games, which could be more explicitly included in the OT education and in our ErgoWorld simulation, to turn these language games into factual possibilities for graduates regarding available career paths. These emergent language games and the factual possibilities they represent could be integrated in role-play exercises and game based learning, to create learning situations of cooperation between teachers and students, facilitated by their language games leading to pragmatically valid actions for the profession.

Name of Language Game Family	**Main professional context, e.g. the factual knowledge for OT**	**Actors and factual possibilities**	**Professional focus of the language game, e.g. values for OT professionals**
Clinical	Private Homes Hospital	Actors: Patients and other healthcare professionals Factual possibilities: Clinical Dialogue for healing	OT in clinical contexts and aimed at citizens wellbeing, formulating a suitable therapy and heal the patients or find the least painful way of everyday life (native OT language games)
Commercial	Private companies, OT practitioneers as employed or owners	Actors: Customers (individuals or groups) Factual possibilities: Therapy for healing or Consultancy, Communication, Sales	Freelance clinical OT practice for individuals, companies or institutions proving additional support to citizens in pain, who are not receiving enough care from the public sector Marketing – Customer consultancy for companies and embedded business values and having a job in the OT field
IT-innovation	Private Companies	Actors: Users (patients and therapists) Stakeholders (administrators of clinical context and municipalities) Factual possibilities: Mediation and Involvement of Users and Stakeholders in innovation processes for betterment/update of OT practice	Development of new technologies targeting OT clinical practice, where therapists provide expert knowledge of user-groups and their needs, and how to include the actors in the innovation processes
Public administration	Municipality	Actors: Citizens, Local Institutions and Hospitals Factual possibilities: Mediation and Communication for design of Policies and Purchase of Equipment and Technologies for local institutions like hospitals and rehabilitation centers	Consultancy regarding purchase of existing technologies, mediators with companies and clinical contexts with focus on conducting language games with actors, as functioning practices for all involved

Table 3 *Identified emerging language games in OT practice*

As illustrated above in Table 3, each language game family is different according to the categories of our analytical framework.

The first language games family we analyzed is the clinical one, which involves an actor group consisting of patients, defined as people affected by neurological damage, and other healthcare professionals. It is performed with the purpose of formulating a suitable therapy and heal the patients, or in the most severe cases to find less painful ways to deal with everyday life. According to our data, healthcare intended as a healing practice is deeply intertwined with the identity of OT teachers and students, who see themselves as actors in the clinical ecologies of hospitals and in the patient's home. Learning digital media designed for OT education tend to focus on the clinical language game, without exploring alternative OT language games, as exemplified in the survey conducted by Bennet et al. (2017).

The emerging families of language games confront OT professionals and students with mind-sets belonging to the business and engineering sectors, hence the head of the union argued: "We are experiencing a loss of identity!" She also added that this affects graduate students, who have dreamt of becoming healers, but when being unable to find their dream job end up

disappointed and "have to reinvent a new role for themselves." In this regard, she mentioned that several OT graduates have opened freelance practices, where they provide additional support to citizens in pain, who are not receiving enough care from the public sector, such as athletes, companies or institutions who want to build inclusive working environments for their employees. In the family of commercial-freelance language games, OT professionals still share some values with the clinical language games, but operate in different factual conditions (ecologies). As freelancers, OT professionals must reformulate their factual possibilities based on the values embodied in a commercial language game, in which their role shifts from healers hired and paid within the public sector, to private practitioners selling a service, and patients shift to become customers (Table 3). This transition demands OT professionals to obtain different factual knowledge, matching new factual possibilities for freelancers such as: marketing strategies, self-promotion, discussions of bills with their customers, adding pressure to acquire competences from fields unrelated to healthcare.

OT professionals face a similar challenge when entering the sector of IT innovation in private companies, dealing with factual possibilities of development of analogue or digital equipment for healthcare, such as: ergonomic furniture and tools for daily activities, kitchenware, stationary, or toiletries for people who were once patients. OT professionals need then factual knowledge from IT innovation and must relate to actors, who were once patients or colleagues (clinical OT, physiotherapists, doctors etc.), as users of products with values to be investigated for the sake of product design. In these factual conditions, OT professionals might provide factual knowledge to the development team, use factual possibilities for involvement of potential users, and facilitate the IT-innovation language games. This family of language games represents extensive changes to the native OT-language game, acquired through OT education.

The last family of language games that we identified refers to public administration, where OT professionals can be employed within the public sector as consultants and mediators for citizens and other institutions. In these language games, OT professionals may still be in close contact with hospitals and patients; however, the factual possibilities will be very different. OT professionals must relate to patients as citizens, who need help applying for financial support to purchase specific equipment. A familiar language game emerges for OT professionals employed by public administration to be in charge of dialogues with clinical OT professionals and doctors, for instance to test new equipment. Similarly, OT professionals might address public institutions, like schools, museums and administrative centers, to help them create healthier environments.

In conclusion, we argue that the native and emergent language games in OT reveal the magnitude of the impact of the ongoing digitalization on OT practice, bringing values from other fields and forcing graduates to confront themselves with different ecologies of practice, and hence challenging their identity. As a result, OT professionals must acquire an open attitude towards their future career and be ready to adapt to different roles, adapt their relations to the other actors and adapt the operational use of their knowledge.

Conclusion

Our study discusses results from a design inquiry, aimed at developing a simulation for OT education and led us to uncover that the digitalization of OT practice, combined with financial cuts, is reconfiguring roles, duties and values for professionals. Data gathered through our study shows that the effects of this evolution can be traced analyzing how professionals and teachers articulate the new reality that await OT graduates, as not all of them will be able to land a clinical position and many will have to rethink their professional identity.

As we became interested in understanding the changes occurring in OT, we formulated an analytical framework based on a pragmatic constructivist perspective (Nørreklit, 2020) of the language game theory by Wittgenstein (1958). Moreover, we referred to an ecological perspective on the digitalization of practice (Nardi & O'Day, 1999) to analyze changes in contexts of practice and education, in relation to specific actors, artifacts and their mutual relations, articulated through the languages games in which they are supposed to engage.

As a result, we identified four families of language games currently related to OT practice, which facilitate different construction and coordination of meaning for OT therapists:

1) The clinical language games, which we consider the native language game, rooted in clinical ecologies,

2) The commercial-freelancers language games, rooted in ecologies of private businesses selling services,

3) The IT innovation language games, rooted in ecologies of product development,

4) The public administration language games, rooted in bureaucratic work practice, where therapists act as intermediaries between different actors in their municipality.

We found that these language games imply different factual possibilities for graduates, in relation to how they will affect the world around them in their career paths, and how they will relate to the other actors. According to our interviewees, students see themselves as future healers of their patients. However, the relationship of the actor-patient is the most challenged by the emergent language games, as the patient transforms respectively into a customer of a service, a technology user or a citizen looking for financial aid. Therefore, recent changes are compromising the core of OT professional identity and, in this respect, we propose that the OT-education might strengthen its focus on:

1) Students' learning of links between theory and practice, playing language games and joining prior unknown language games in a meaningful way in their learning environment;

2) Facilitating the students' abilities to create and play language games in different ecologies, and engaging with emerging OT practices and their language games, through digital simulation such as ErgoWorld.

In future studies, we might investigate how OT education could strive to expand from the clinical OT ecology to embrace the three emerging language games and their related ecologies, representing OT professionals as able to engage successfully in a variety of professional ecologies. In this way, students should be enabled to consider other factual possibilities available to them, which translate into multiple identities and career paths, enlarging their employment possibilities.

This has implications for the design of our simulation, which should explicitly represent OT professionals from a broader perspective, centred on the different meanings and values that OT clinical skills can acquire, depending on the different ecologies of practice. The purpose of such a simulation should be to prepare the students to acquire grammar and references in emerging language games relevant for their future. However, in proposing a digital tool, we need to be aware that we are implicitly reinforcing the need for OT to incorporate the IT language games and its values, and thereby we further the emergence and impact of such games.

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Endnotes

1 See the section entitled *Methodology – a participatory design perspective on healthcare digitalization*.

2 The prototype is presented in the following section, and more precisely in the second sub-section entitled *Prototyping and testing*.