

Conceptual Change During the Professional Socialization Process

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Through the professional socialization process, novice family and consumer sciences (FCS) students are asked to let go of their lay knowledge about the profession to make room for changes to their existing mental schema. The premise of this paper is that the professional socialization process is better ensured if it is informed by conceptual change theory. Three different lines of conceptual change inquiry (i.e., knowledge as theory, elements and context) are discussed. Application of these lines helps university program planners and faculty better appreciate and facilitate the intellectual challenge they are expecting novice professionals to embrace.

Higher education FCS, home economics, and human ecology (hereinafter FCS) degree programs are charged with socializing laypeople into the profession ensuring they identify with the profession upon graduation (Cornelissen, 2006; McGregor, 2011). A layperson is not formally trained nor qualified in a particular profession and does not have specialized or professional subject knowledge. Their notions of and knowledge about the profession arises from outside the academy (Maranta, Guggenheim, Gisler, & Pohl, 2003) and are often based on positive or negative personal experiences, biased pigeonholes, misrepresentations, and stereotypes.

Professional socialization serves to augment lay knowledge with discipline- and profession-specific knowledge. It is “the process by which people selectively acquire the values and attitudes, the interests, skills and knowledge – in short, the culture – current in groups of which they are, or seek to become, a member” (Merton, Reader & Kendall, 1957, p. 278). Students are expected to move from being a novice through apprenticeship and maturity to an emergent professional. The latter has internalized and committed to the professions’ mission and mandate (see Figure 1, drawn from Weidman, Twale, and Stein, 2001).

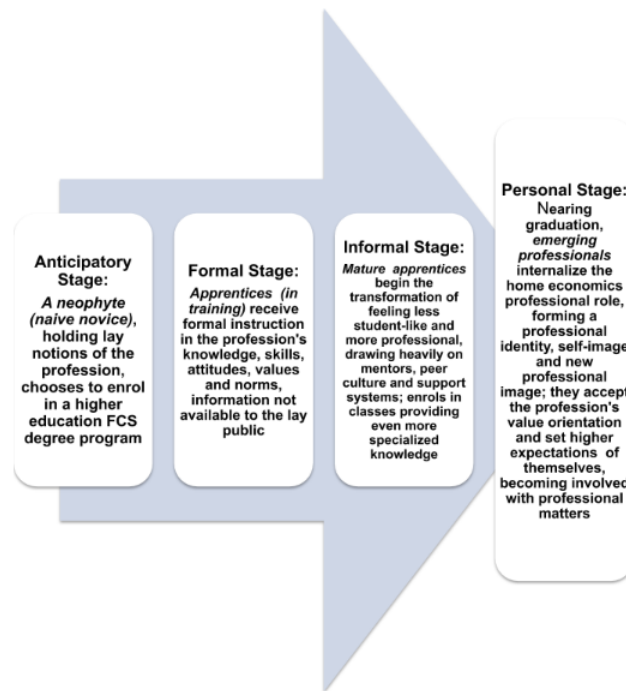
The socialization process involves deep and far-reaching conceptual change necessary to relinquish inherent reliance on lay knowledge. Conceptual change refers to “the process by which people’s central organizing concepts change from one set of concepts to another, incompatible with the first. [That] is, how concepts *change* under the impact of new ideas or new information” (Posner, Strike, Hewson, & Gertzog, 1982, p. 211). To identify with the profession, novice students must internalize the profession’s norms and values into their mental schema.

Mental Schema

Mental schemas are internal sets of interrelated concepts that people draw on when facing the problem of interpreting what they are experiencing (Cartelli, 2009). Examples of schemata

include worldviews, internal scripts, and social scripts (Nadkarni & Narayanan, 2007). In this paper, lay knowledge of FCS is considered a mental schema. People rely on schemas to understand their world and rapidly process new information with little effort, made possible because schemata serve as a heuristic (Greek *heuriskein*, “to find”) for sorting through memories to make sense of a situation. These internal search rules simplify information processing and decision making.

Figure 1. Stages of Professional Socialization Process.



Ironically, schemas can sometimes hamper the uptake of new information with the mental rules precluding acceptance of new input (Tuckey & Brewer, 2003). This can be problematic because mental schemas are quite stable even in the face of contradictory information (Nadkarni & Narayanan, 2007). They are both a structure of preconceived ideas (e.g., lay knowledge) and a system of organizing and perceiving new information. People tend to pay more attention to things when they fit within their schemata or frame of reference (Nadkarni & Narayanan, 2007). FCS curriculum must, therefore, be planned in such a way that it accommodates initial push back against contradictory notions of what the profession is about. To complicate matters, students' attention to new information can be diverted through naivety and blind spots, which is also problematic because deeply entrenched lay knowledge is hard to pry open and replace.

Naivety

The first stage of professional socialization is novelty and naivety (Weidman et al.,

2001). Conceptual change researchers use the idea of naivety to refer to people's reliance on lay notions. They are interested in understanding how students move from naive to more sophisticated conceptualizations (Vosniadou, 2007). Naive means lacking experience, wisdom or judgement. Naive people often deliberately reject or lack knowledge of sophisticated approaches and alternatives, relying instead on entrenched, popular or lay conceptualizations (Anderson, 2014).

This is not surprising given that "experts are supposed to be knowledgeable and lay persons are ignorant" (Maranta et al., 2003, p. 150) meaning they lack knowledge or awareness. Appreciating this, FCS curriculum planners and faculty members need to remain open to the possibility of protracted push back from naive students until they overcome the urge to fall back on lay knowledge and become receptive to more sophisticated understandings of the profession and discipline. Resistance is natural but not conducive to professional socialization (Weidman et al., 2001).

Blind Spots

Another way to conceive this naivety is to view it as a conceptual blind spot, which refers to conventional wisdom that no longer holds true but still guides thinking (Porter, 1980). At first, naive students will be inclined to hold onto convention (i.e., what they think and know) and draw comfort from their lay knowledge of the profession even when it becomes evident that it no longer holds true. These blind spots impair people's ability to see reality for what it really is (Tuchman, 1985); it is too easy to fall back on memory search heuristics. The additional term "cognitive blind spots" reflects the idea that people often do not know they have a blind spot; that is, "we do not see *that* we do not see" (von Forrester, 2003, p. 284).

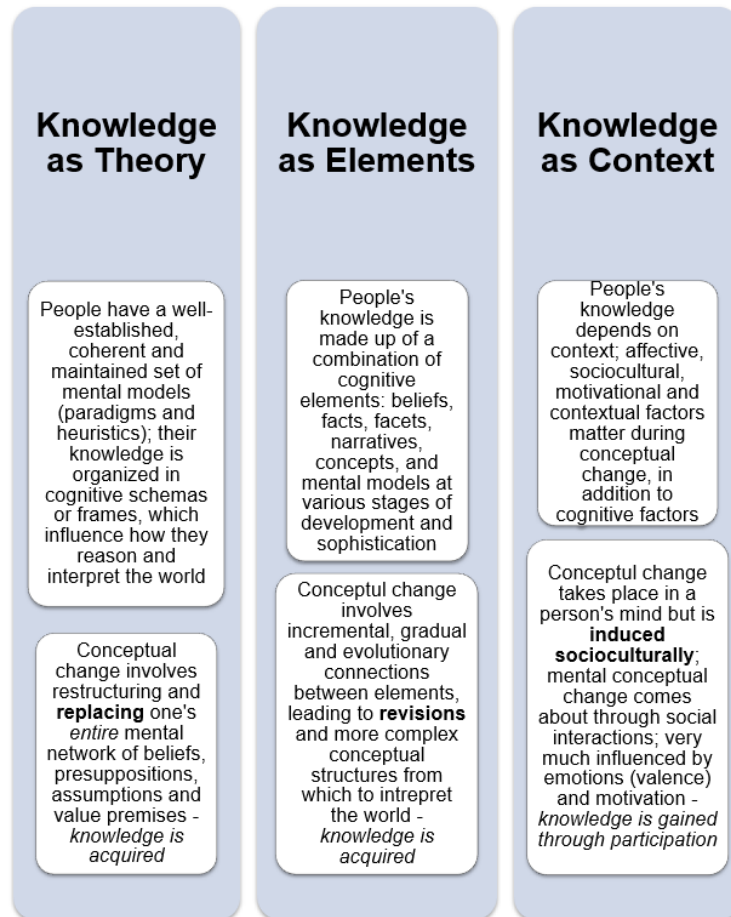
Blind spots can make it very difficult to accept that phenomena can be seen and understood from alternative perspectives (Meyerson & Martin, 1987). FCS curriculum planners and faculty members need to appreciate that naive students' natural blind spots represent what they "don't know enough to even ask about or care about" (Wagner, 1993, p. 16). Blind spots keep students from seeing the profession as clearly as they might (Wagner, 1993). Faculty need to respect and work around and through these blinders if they want naive students to engage in conceptual change during their studies.

Main Approaches to Conceptual Change Theory

Asking novice students to let go of their lay knowledge about the profession to make room for new knowledge involves them changing their mental conceptual schema. This pedagogical challenge can be understood using conceptual change theories. Originally conceived by Posner et al. (1982), conceptual change has evolved into a thriving line of inquiry, rich with nuanced, ongoing debate amongst theory proponents (Özdemir & Clark, 2007). It is focused on what is involved in people changing their central organizing concepts about a phenomenon when exposed to new information and ideas about it (Posner et al., 1982). An example is novice FCS students being asked to see the profession as a powerful change agent focused on the family for the good of humanity (East, 1979). It is quite likely they did not enter the program with this conceptualization in mind.

Conceptual change theories offer insights into how students learn new, abstract concepts and constructs and how existing and newly acquired concepts change with ongoing learning and development (Mason, 2007; Vosniadou, 2007, 2013). Although there are no widely-accepted, well-articulated and tested theories of conceptual change (diSessa, 2006), three approaches have evolved: knowledge as theory, elements and context (see Figure 2). *Knowledge as theory* assumes that people’s knowledge is a “coherent, unified framework of theory-like character” (Özdemir & Clark, 2007, p. 351). This “overarching hierarchal conceptual structure” (p. 352) can only change if learners experience a radical paradigm shift enabling them to assimilate and accommodate new ideas. The *knowledge as element* approach assumes people understand things in terms of “collections of multiple quasi-independent elements [comprising beliefs,] facts, facets, narratives, concepts, and mental models at various stages of development and sophistication” (Özdemir & Clark, 2007, p. 354). The *knowledge as context* approach focuses on the role of emotions, social factors, motivation and context during conceptual change (Mason, 2007; Vosniadou, 2007). Implications for FCS curriculum planners and faculty members are integrated into the discussion of these three approaches.

Figure 2. Major Approaches to Conceptual Change Theory



Knowledge as Theory

A person's current conceptualization will influence their receptiveness to and selection of new concepts (Davis, 2001; Özdemir & Clark, 2007; Posner et al., 1982). The lay knowledge held by novice FCS students will affect their receptivity to expert knowledge about the profession. These existing conceptions are extremely resilient and highly resistant to change because concepts are so dependent upon the cognitive artifacts within a person's "conceptual ecology" (Posner et al., 1982 p. 212). This is the internal environment within which all information is interpreted. It helps students reason about what they observe and are exposed to during learning. Resultant changes in this internal environment (i.e., collection of concepts) reflect new knowledge being absorbed and integrated into it (Park, 2007).

To complicate the situation, this approach assumes conceptual change and the acquisition of new knowledge is a gradual process with change occurring at the level of individual concepts. Because some concepts are attached to others, the revision of one may require revisions to others (Chi, 2008; Özdemir & Clark, 2007; Vosniadou, 2013). For example, if a novice student succeeded in replacing the concept of "FCS is just cooking and sewing," that student would also have to reconceptualize these activities as more than mundane. Because concepts are also connected through belief systems, students' beliefs must be open to revision and radical shifts (Chi, 2008; Özdemir & Clark, 2007; Vosniadou, 2013). Belief shifts may be difficult because lay notions are deeply entrenched (Maranta et al., 2003).

The knowledge as theory approach further presumes that conceptual change is likened to a paradigm shift. At any given point in time, people maintain a small number of well-developed coherent mental models that provide consistent predictions and explanations across significant domains in their lives (Davis, 2001; Kuhn, 1970; Özdemir & Clark, 2007). These entrenched paradigms (including attendant mental schemas) constrain future learning of new concepts, making the conceptual change process difficult because people must revise and restructure an entire mental network of beliefs, presuppositions, assumptions and value premises (Chi, 2008).

The latter forms the foundation of people's knowledge so any revisions may have serious implications for subsequent knowledge structures that are based on them: a lot has to change, and the change will be deep (Vosniadou, 1994). Consequently, if they embrace this theory of conceptual change, FCS faculty must remain cognizant of what is involved when facilitating paradigm shifts (see McGregor, 2006) and appreciate the pedagogical philosophy of deep learning, which involves self-reflection and examining one's beliefs and value system (Nicholls & Adolphus, 2003).

Knowledge as Elements

Whereas knowledge as theory views conceptual change as a "broad, theory-replacement process," knowledge as elements involves "a piecemeal evolutionary process [by which] elements and interactions between the elements are revised and refined through addition, elimination, and reorganization" (Özdemir & Clark, 2007, p. 355). The knowledge as theory approach assumes knowledge is organized in schemas or frames. Changes to concepts are revolutionary, with change or innovation leading to a new frame. In contrast, the knowledge as

elements approach assumes conceptual change is incremental, gradual and evolutionary replete with times when conflicting ideas can coexist within a person's conceptual ecology (Özdemir & Clark, 2007).

This approach further assumes that implicit presumptions can influence people's reasoning when interpreting the world (Özdemir & Clark, 2007); they assume things happen in life just because "that is the way things are." These unquestioned beliefs emerge from people's experiences, observations and abstractions of phenomena, including lay knowledge of FCS. However, with help, incremental changes in these concepts can occur over time. FCS curriculum planners should thus be very cognizant of the role scope and sequence plays when designing curricula. This involves a concern for what to teach at what level of detail and in what order based on both learners' needs and the content that must be taught (North Dakota Department of Public Instruction, 2000).

Assuming that people spontaneously connect and activate existing knowledge pieces (elements such as facts and beliefs) with little effort (i.e., they use already-learned heuristics), the knowledge as elements conceptual change process leads to a total renewal and reorganization of these pieces and interactions among them. In this process, small elements get reconnected to create more complex conceptual structures resulting in a more complex base from which to interpret a phenomenon (Özdemir & Clark, 2007). This means that blind spots and naivety are somewhat mitigated.

When embracing this approach to conceptual change, FCS faculty must accommodate gradual, step-by-step changes in students' internal conceptualizations of the profession. This involves honoring their lay knowledge while respectfully augmenting it with discipline- and profession-specific knowledge and perspectives. Students will slowly become comfortable with letting go of their lay notions and eventually open up to being socialized into the full remit of the profession. These incremental changes depend heavily on FCS instructors fully appreciating the need to remove students' blind spots.

Knowledge in Context

The cognitive approaches (i.e., knowledge as theory and elements) may underestimate the complexity and diversity of conceptual change phenomena because change is not solely influenced by cognitive factors (diSessa, 2002). Instead, affective (emotional), social-cultural, motivational, and contextual factors can also contribute to conceptual change (Davis, 2001; Mason, 2007; Sinatra & Pintrich, 2003). Jovchelovitch (2007) coined the term *knowledge in context* to account for the cognitive and social nature of conceptual change.

Emotional. The adoption of alternative viewpoints that contradict existing stances requires changes to the valence people hold for the new ideas (Thagard & Zhu, 2003). Valence means chemistry - a visceral reaction to an idea. "Emotional conceptual change is a change of valence from positive to negative or vice versa" (Thagard & Zhu, 2003, p.100). To illustrate, in order for students to accept FCS as a focus on family for the good of humanity (East, 1979), they would not only have to change their beliefs about family and how it possibly relates to the whole of humanity, but also change the valence they have for these three concepts: the family, the good, and humanity. FCS curriculum planners will need to be aware of how new ideas about the

profession resonant with novice students and attend to how and if these initial reactions change over time.

“Entrenched emotional attitudes may be a substantial barrier to . . . largescale cognitive-emotional shifts” (Thagard & Zhu, 2003, p. 101). Helping others intentionally understand and evaluate the emotional responses they have to alternative points of view makes it easier for conceptual change to occur (Sinatra and Pintrich, 2003; Thagard & Zhu, 2003). Dealing with valence in FCS university curricula could thus entail inventorying students’ positions on and visceral reactions to key concepts when they enter the program and then monitoring shifts in valence as students progress. A learning passport could be used to gauge evolutions and transformations in emotional valence for key FCS concepts and principles. This self-maintained record of learning achievements can help students to stay motivated (Lai, Yang, Liang, & Chan, 2005). Sustained interest in learning new ways to understand the profession will move students along the professional socialization continuum (see Figure 1).

Social-cultural and motivational. The social-cultural approach holds that affective, motivational, and personal variables matter during conceptual change. “Conceptual change cannot be seen as an individual, internal, cognitive process but as a social activity that takes place in a complex sociocultural world and that the surrounding situational, cultural and educational context should be taken into account” (Vosniadou, 2007, p. 58). Accordingly, conceptual change involves people doing more than replacing an incorrect conception with a correct one. It entails appreciating that context helps students determine when different conceptions are appropriate in addition to being (in)correct (Vosniadou, 2007).

Also, knowledge is activity that cannot be considered separately from the context in which it takes place; hence, knowing means belonging, participating and communicating during a process of enculturation into a learning community. This contrasts with the cognitive perspective wherein knowledge is an entity in someone’s head and knowing means possessing that knowledge. Furthermore, conceptual change goes beyond modifications of one’s conceptual structures to a concern for their embeddedness; that is, how firmly fixed they are in the person’s mind (Mason, 2007).

In summary, the socio-cultural approach assumes that conceptual change takes place in an individual’s mind but is induced socioculturally. Conceptual change is inseparable from the context in which it occurs, including social practices of communication and discourse (Mason, 2007). While the cognitive approach to conceptual change embodies the acquisition metaphor (i.e., individual minds can acquire, develop and change concepts), the contextual approach uses the participation metaphor: concepts are gained through knowing and doing and participating in social and cultural activities (Sfard, 1998). Conceptual change is a mental change that comes about because of social interactions, a process that is greatly influenced by motivation and emotions. These determine when someone retains or adopts a new frame of mind (Thagard, 2003).

If FCS curriculum planners embrace the knowledge in context approach to conceptual change, they and other faculty members could turn to several attendant strategies including fostering communities of practice and learning communities among novice students. They could facilitate social activities and engagements that provide opportunities to change their internal

conceptualizations of the profession by drawing on and being inspired by sociocultural stimulants. The curriculum could include a reflective component in concert with instructional strategies such as discourse, dialogue and conversations. Students could also have opportunities to engage with the valence of any new orientations that are challenging or augmenting their lay knowledge.

To continue, the learning community and reflective curriculum could also provide students time to question their motivations for entering and remaining in the profession and query how they feel about this affective aspect of their socialization into the profession. Finally, the curriculum could help students appreciate that the new mental schema they are being asked to formulate will serve as a tool for engaging with peers and others about issues pertinent to the profession. If they choose to or are convinced to identify with the profession, this new mental schema should become embedded in their professional psyche.

Accommodating Conceptual Change

To help novice and maturing students to accommodate conceptual change, FCS faculty need to be cognizant of factors that affect mental schemata change. These include students' perceptions of the intelligibility, plausibility and fruitfulness of the new FCS material and information along with dissatisfaction at some level with their existing conceptual framework (including lay knowledge) (Park, 2007; Posner et al., 1982).

Intelligibility

For students to consider any alternative conception of the profession, they must find it intelligible and be able to internally represent it in their mind. Only then can the concept become a tool of thought for them to use (Posner et al., 1982). Such is the case for reframing FCS from lay knowledge. However, aside from superficially knowing what new ideas mean individually, intelligibility also involves grasping what they mean when combined as a whole. This type of learning is very demanding because it is so easy to simply use lay knowledge in a superficial way without the necessary revisions to one's conceptual ecology (Posner et al., 1982).

To offset superficiality, opportunities for deep learning need to be provided wherein students delve into both lay and newly-acquired knowledge in detail, understanding and questioning basic principles, assumptions, beliefs, and value systems (Nicholls & Adolphus, 2003). Deep learning helps students extract meaning from their learning experiences and life (Warburton, 2003) so they can expand their understandings and make the new concepts more intelligible.

Plausibility

Another challenge to embracing conceptual change is the plausibility of what students are being asked to accept. If the new idea is counterintuitive to their long-established way of knowing, there will be much resistance and implausibility (Posner et al., 1982). A prime example of this is asking students to accept FCS as an agent of change and empowerment. It goes against people's intuitive senses to ask them to accept that FCS is anything more than technical skills for cooking and sewing.

As long as students remain committed to their current beliefs and cognitive blind spots, they will find any new conceptualizations counterintuitive and implausible. To place less energy on “protecting [one’s] metaphysical commitments” (Posner et al., 1982, p. 220), people must delve deeply into self reflection to determine the strength and depth of their beliefs because this determines the extent to which they can move past the implausibility of the new idea (see also Kincheloe & Steinberg, 1993). This means that faculty are charged with convincing students of the merit of the views of the profession being promoted in the degree. Students need to accept this image of the profession as plausible and then choose to identify with it.

Fruitfulness

Accepting a new idea is also contingent upon the fruitfulness of the new conception (Posner et al., 1982). If an idea is fruitful, its application will produce fertile and rich insights and helpful outcomes. For people to embrace a new conceptualization, they must be convinced of its potential to be productive and achieve significant results when applied. If new insights and discoveries are produced when they apply the new idea, “then the new conception will appear fruitful and the accommodation of it will seem persuasive” (Posner et al., 1982, p. 222). In effect, a plausible conception must be intelligible, and a fruitful conception must be intelligible *and* plausible (Duit & Treagust, 2003). This means, for example, that novice students need to find the concept that “FCS focuses on the family for the good of humanity” as both intelligible and believable before they will ever consider using it to see if it is fruitful. This indeed is a conceptual challenge given how stereotypical notions of FCS shape most day-to-day, lay thinking of the profession.

Dissatisfaction with Existing Conceptions

Finally, Posner et al. (1982) proposed that people “must first view an existing conception with some dissatisfaction before [they] will seriously consider a new one” (p. 220). People are less inclined to receive new ideas if they cannot be convinced that their current conceptualization is inadequate. Novice FCS students have drawn on their lay knowledge about the profession for many years believing it has served them well despite it being potentially erroneous and stereotypical. The role of the FCS curriculum is thus to convince novice students both that (a) their lay knowledge may be incorrect, inadequate, even harmful if perpetuated and (b) the degree was designed to move them beyond this novice status through apprenticeship to emergent professional. Students will eventually become dissatisfied with their lay knowledge and yearn to become more sophisticated.

In short, FCS instructors need to help students (a) create mental pictures of the new concepts, (b) appreciate that it is reasonable to accept the new ideas, (c) avail opportunities to apply them so their fruitfulness is appreciated, and (d) become convinced that their lay knowledge needs to change given the intelligibility, plausibility, and fruitfulness of the new ideas about the profession. With trust and credibility (Maranta et al., 2003), university programs can instill in naive students a deep sense of identity with the profession.

Conclusion

The professional socialization process is better ensured if FCS faculty appreciate the merit of drawing on conceptual change theory as it complements the professional socialization model. Marrying the two lines of inquiry yielded useful insights into how the curriculum and its implementation can be purposefully designed and developed to better ensure that novice students graduate with a solid identity with the profession. This entails respecting and honoring their lay knowledge while instilling the merit of letting it go to make room for discipline- and profession-specific knowledge.

Changes to their naive conceptualization of the profession can be facilitated by viewing changes in their knowledge as focused on (b) broad shifts in overall conceptualization, (b) incremental tweaks to specific elements, and (c) respect for the context; respectively, knowledge as theory, elements and context. Informed by conceptual change theories, FCS faculty are better prepared to ensure that students leave the program with a respect for and identity with the profession - the ultimate goal of professional socialization.

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