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Fixedness and Fluidity in Knowledge Building Communities: An Exploration of Students' Identities as Knowledge Builders

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Abstract: Knowledge building communities (KBCs) are a growth promoting pedagogy because they encourage ever deepening discourse. Yet, the personal challenges associated with developing a students' identity as a knowledge builder remains undertheorized. In this study, we aim to rise above existing theories of fixedness and fluidity, such as the theory of mindsets and person-centeredness, to examine how students respond to the challenges and obstacles of knowledge building as a community. We examine a KBC of graduate students where significant personal and community reflection sessions are designed for, providing us with a window into the way students' identities as knowledge builders are shaped by, and shape, the KBC. Our findings show a discrepancy between mindset measures using questionnaires, that show little effect, with microanalyses of students where we carefully trace deep, emotional, and situated transformations towards openness and fluidity. We offer a preliminary framework of fixedness and fluidity in KBCs that have both theoretical and practical implications on knowledge building.

Introduction

The theory and pedagogy of knowledge building communities (KBCs) address contemporary educational challenges of the innovation age by being based on principles such as continuous knowledge improvement, exploration of authentic problems, and advancing collective knowledge (Scardamalia & Bereiter, 2014; Zhang et al., 2011). Understanding these principles, however, is not a trivial matter for its participants. It oftentimes requires students to undo the fixed learning practices they enculturated in traditional schools, as well as work through advanced stages of personal growth so they can engage productively in the ever-deepening knowledge building process. In recent years, scholarship in KBCs has begun to address questions related to students' identities, dispositions, and mindsets as knowledge builders (Authors, 2018a; Kici & Scardamalia, 2018), yet the personal challenges associated with engaging in the knowledge building endeavor remain undertheorized. Our contention is that as individuals become more growth oriented, they should be able to contribute to the collective knowledge base more effectively. To address this, in this exploratory study we draw on two frameworks that conceptualize personal growth as the movement between fixed and static states with those that are growth-oriented, adaptive, fluid, open, and flexible. We explore these dimensions in the context of a graduate-level KBC, providing data from established measures along with a case study of one student's transformation. Our aim is to create a preliminary framework of personal fixity and fluidity in KBCs.

Background

In this section we review two influential psychological theories that are relevant to framing a fixed-growth continuum in relation to knowledge building: The theory of mindsets (Dweck, 2006) and the person-centeredness approach (Rogers, 1961/1995).

Fixed and Growth Mindsets

Based on several decades of research mainly around people's implicit beliefs on intelligence and its relation to motivation, Carol Dweck (2006) offered a theory of mindsets that is relevant to process-oriented learning (Boaler, 2016). Evolvement of society toward a more independent way of living and working requires that the institution of schooling adjusts in significant ways, seeking to cultivate self-sufficient, lifelong learners consistent with the ideas underlying mindset research (Asia Society/OECD, 2018; Collins, 2017; National Research Council, 2012).

The core of mindset theory is based on one's belief regarding intelligence as being static (fixed) or malleable (growth). According to the entity theory, people make assumptions regarding their intelligence as being a fixed trait.

In contrast, according to the incremental theory, people make the assumption that intelligence is a malleable trait that can be developed with effort. People's implicit theories about intelligence influences their self-esteem, the way they cope with challenges, setbacks, and even their love of learning (Dweck, Chiu & Hong, 1995). People on the fixed side of the continuum (fixed mindset) tend to perceive success, abilities, and talents as proving they are intelligent, and therefore are more likely to pass up opportunities to push their limits because failures come with the risk of jeopardizing their attributed beliefs. People on the growth side of the continuum believe these things can be stretched or improved with effort, making them more likely to embrace challenges as opportunities for growth (Dweck, 2006).

Dweck's conceptualization has been widely published and influential across educational research. Sagy, Kali, Tsaushu, & Tal (2016), for example, showed how fixed mindsets and performance orientations are associated with learning cultures based on external values; whereas growth mindsets and learning orientations are associated with cultures based on internal values. In the context of KBCs, Authors (2018b) examined the fixed and growth mindsets of grade five students studying science, showing how mindsets were expressed with students' attitudes, beliefs, feelings, understandings, and practices. Another study by Kici & Scardamalia (2018) investigated change in high school teachers' practices through knowledge building utilizing growth mindset theory. Table 1 summarizes some of the key dimensions from research on mindsets that are relevant to KBCs.

Table 1: Key Dimensions of Fixed and Growth Mindsets

Dimension	**Fixed Mindset**	**Growth Mindset**
Belief about intelligence	Entity, static	Incremental, malleable
Cultural values	External	Internal
Dealing with obstacles or setbacks	Avoidance	Seen as learning opportunities

Person-Centered Conceptions of Fixedness and Fluidity

The person-centered approach, while most widely applied within counseling and psychotherapeutic settings, has been very influential within educational contexts (Rogers, 1969) and is highly relevant to the issue at hand. Rogers upended decades of therapeutic perspectives by suggesting that personal growth does not entail moving from one fixed position to another, but from a fixed position to one that was continually changing (Rogers, 1961/1995). In Rogers' (1969) *Freedom to Learn*, he suggested that education must put trust in its students, allowing them the freedom to explore problems that are authentic to their interests and personal growth trajectories. However, he noted that the responsibility put on the shoulders of students could be threatening, and he extensively detailed how people in such contexts (provided with the appropriate conditions of unconditional positive regard, empathic listening, and congruence) slowly worked through these challenges, making this highly relevant to the development of students' identities in KBCs (Rogers, 1957). Sanders (2006) provides a general summary of Rogers' continuum, noting six key dimensions on a seven-stage continuum (Table 2).

Table 2: Key Dimensions of Fixity and Fluidity based on the Person-Centered Perspective Applied to KBCs (Adapted from Sanders, 2006)

Dimension	**Stage 1**	**Stage 7**
Feelings	Process is so fixed and stuck that the person is unlikely to participate in the KBC -- they think everyone else has a problem.	Process so spontaneous and fluid that almost continuous change happens outside the KBC as much as in it.
Internal dialogue		
Expression differentiation and elaboration of experience		
Perception of problems		
Attitude to change		

Bodily changes		

According to Rogers' theory of growth, for a person to be able to shift from fixity to fluidity she needs to experience herself as being fully received. This includes acceptance of feelings such as anger, fear, insecurity and of any mode of expression such as silence, tears, and words, all of which are part of her being at that moment (Rogers, 1961/1995). Unconditional acceptance allows a person to shed any masks concealing her true feelings and thoughts without the fear of being judged. This allows dealing with hard feelings or difficulties associated with the learning process. The continuum between fixed and fluid is arbitrarily divided by Rogers into seven stages. The first stage is of full fixity, where no problems are perceived and there is no desire to change. Moving along this continuum, gradually, there is growing self-responsibility to face problems, more recognition of personal rigidness, and expressions of feelings while accepting them as being owned in the present. At the seventh stage the person reaches a point where personal constructs become tentative, constantly validated, allowing spontaneous growth to occur as a person is open to experience and fully functional (Rogers, 1961/1995).

In recent years, Authors (2018a) have introduced person-centered activities into KBCs to provide students with more intentional opportunities for personal growth with the belief that these would promote their collective idea-advancing endeavors. Regular group reflection activities as well as public (on the online platform) personal reflective diaries foster a growth promoting climate (Rogers, Kirschenbaum, & Henderson, 1989). Using this unique context as a way to access students' identities as knowledge builders, we explore how the two models of fixedness and fluidity are played out in the stories of adult student participants. Specifically, we asked *how do students change both along Dweck's fixed and growth mindset continuum as well as Rogers' person-centered conception?*

Methods

To answer these questions, we investigated a graduate course in an educational technologies program. Specifically, "Challenges and Approaches to Technology-Enhanced Learning and Teaching" (CATELT) was structured as a blended course, where weekly 210 minute face-to-face meetings alternated with ongoing activities for the remainder of the week where students building their knowledge in different online platforms (e.g., wiki, Knowledge Forum). The data corpus included a full 14-week semester of CATELT (2018-2019), with 18 students, an instructor (moderator), and a teacher's assistant (co-moderator). Throughout the semester, we collected data from (a) audio and video recordings of every face-to-face meeting; (b) online artifacts created by the students; (c) open interviews conducted opportunistically; and (d) a standard, six-item pre- and post-course mindset questionnaire as well as several additional questions on a 6-item Likert scale that were more specific to dealing with challenges of classroom knowledge building (Table 3).

To examine if and how students' mindsets changed, we report on the results of the pre- and post-questionnaires. To more carefully examine the two fixed-growth frameworks in situ, we carried out a microanalysis of one student who made observable changes towards personal growth which we present as an exploratory case study. Such micro-analyses are typical in case studies in order to understand and report on the rich, nuanced, and multi-layered learning that goes on in a way that can be meaningful given the full context of a learners' life (Tobin, 2006). To ensure that the inferences and the interpretations about the case we identified were accurate, we conducted micro-analysis meetings (Chinn & Sherin 2014; Schoenfeld, et al. 1993) with a team of three researchers, two of whom were very familiar with the environment. We triangulated multiple sources of evidence and discussed our inferences until we reached a consensus on our interpretations (Schoenfeld, 2007).

Table 3: Mindset questionnaire

#	Question	Category
1	You have a certain amount of intelligence and you can't really do much to change it.	Mindset Question
2	Your intelligence is something about you that you can't change very much.	
3	You can learn new things, but you can't really change your basic intelligence.	
4	No matter who you are, you can change your intelligence a lot.	
5	You can always greatly change how intelligent you are.	
6	No matter how much intelligence you have, you can always change it quite a bit.	
7	I like my work best when I can do it really well without too much trouble.	Dealing with challenges
8	I like work that I'll learn from even if I make a lot of mistakes.	
9	I feel bad when my teacher or peer tells me how I may improve my work.	Getting Feedback
10	I like asking other people to give me feedback on my work because it is a good way to learn.	
11	When something is hard, it makes me want to work less on it, not more	Strategies and Perseverance
12	I like my work best when it is easy for me to succeed	
13	I like my work best when it makes me think hard.	
14	When something is hard, it just makes me want to work more on it, not less.	
15	When I am not sure if my idea is right, I would choose not to share it with my classmates.	Taking Risks
16	I feel its OK for me to share an unsure idea with my classmates because they may build on it to create better ideas.	

Findings

Fixed and Growth Mindset Questionnaire

The results from the pre-post Mindset questionnaire (4 students opted not to take it) showed an overall negative change in students towards more fixed mindsets (Mean = -1.1), with three students moving in the direction of growth, two showing no movement, and nine moving towards fixedness. Similar results occurred with the supplementary questions, with five students moving towards growth, one without movement, and seven towards fixedness (Table 4).

Table 4: Results from mindset and supplementary questionnaire

	Mindset			Supplementary			Total		
Student	**Pre-**	**Post-**	**D**	**Pre-**	**Post-**	**D**	**Pre-**	**Post-**	**D**
B	19	29	10	48	46	-2	67	75	8
H	28	33	5	52	52	0	80	85	5
J	30	31	1	35	29	-6	65	60	-5
D	25	25	0	41	46	5	66	71	5
N	26	26	0	44	38	-6	70	64	-6
A	36	35	-1	46	48	2	82	83	1
F	22	21	-1	43	44	1	65	65	0
M	27	25	-2	41	46	5	68	71	3
K	30	27	-3	42	41	-1	72	68	-4
L	32	29	-3	44	50	6	76	79	3
C	35	31	-4	53	49	-4	88	80	-8
E	30	26	-4	42	41	-1	72	67	-5
I	29	25	-4	38	42	4	67	67	0
G	26	17	-9	46	44	-2	72	61	-11
MEAN	28.2	27.1	-1.1	43.9	44.0	0.1	72.1	71.1	-1.0
SD	4.4	4.5	4.3	4.7	5.6	3.8	6.8	7.8	5.4

To further explore the meaning of these results in context, in the following section we provide our case study of Nur (student F), whose results were among the lowest among the group and whose results on the questionnaire showed very little change. Her case is highly illustrative of the multi-dimensionality of change and the need to look at multiple frameworks to examine fixedness and fluidity. Analyzing only the mindset questionnaire might lead to the conclusion that Nur remained closer to the fixed side of the continuum overall with little change. However, the full analysis presents a more complex picture that is discussed later.

A Case Study of Fixedness and Fluidity

Nur is a young lady in her 20's from an Arabic origin. Raised in a modern, liberal family in a traditional community, Nur was used to being different from her surroundings from early childhood. She worked as a teacher in a Jewish school where she combined teaching Arabic and special education. Nur began the semester with a smile, looking very calm and excited towards a new beginning. In her first personal online diary entry she wrote about feeling eager to learn and to get to know her new friends.

Fixedness

Despite Nur's appearance of being carefree and open, data showed that she was afraid of being judged by others and and had difficulty dealing with challenges. Showing her fear of judgement, Nur was very quiet during most group reflection sessions until the last few sessions of the semester. She explained her silence during group reflections sessions in her week 03 personal diary, writing "I didn't want to share my thoughts in class in order to avoid people from forming opinions of me as a learner that is unsure of her actions." [1]. These points were also reflected in an interview conducted after the second week's meeting. In the context of a questions about dealing with intellectual challenges, Nur explained her responses:

Nur: Sometimes it goes to giving up… pressure, pressure, pressure and then I give up… I do try to do my best but reach a limit where I must stop, it affects my health. [2]

Int: If there is a task where you make a mistake or do not complete, how are you affected?

Nur: It affects me a lot… It is important for me not to make simple mistakes that others won't make. It is unacceptable for me… I don't give myself a lot of room for error… [3]

Int: ...In general, is it important for you to be seen by others as successful? As someone that knows? As smart?

Nur: It is very important to me… If I don't master the subject being discussed, I prefer to be quiet and learn about it for the next time. [4]

During the knowledge building activities of the face-to-face meetings she would mostly listen to others and participate only when having a solid notion of what she wanted to say. While taking part in a small group discussion, she remarked to the researcher that "everyone is so smart and they are already saying what needs to be said, so I am not adding anything. I prefer not to talk and let them talk." [5]

Steps towards fluidity

During the second face-to-face group reflection session, the discussion veered to the topic of working under pressure. Several students reflected about the many obligations that they had in their lives and the fact that they felt there was never enough time for them to fulfill them all. Although Nur was silent during this discussion, she appropriated the ideas in her second online diary entry:

Nur: I always tend to talk about pressure when I have a task I need to finish, but listening from the side, and the moderator said that pressure/or talking about not having enough time could be just an excuse to avoid obligations, I felt it shook me and thought this was touching something that characterizes me, something that for the first time is reflected in my face so clearly. [6]

Nur's general silence in the face-to-face meetings were inconsistent with her online practices, where she was open and expressive about some of her concerns and difficulties. She addressed this inconsistency in her week 03 diary, suggesting that she had a desire to be known (and therefore was in a process of growth) by the community in writing that "those who would like to learn more about me can enter my personal diary and learn about me as a learner." [7]

During the fourth face-to-face meeting, a community member described her feelings using the metaphor of a wall that she had between herself and the community, preventing her from opening up and participating. For the first time, Nur made a public (albeit brief) statement during a group reflection session that she shared this difficulty. She later wrote about this in her diary:

Nur: This is not new to me, this is how I always cope with every wall between me and a new surrounding (Week 4 diary). [8]

The fifth face-to-face person-centered activity asked students to choose a card and describe how the image and word on it reflected their feelings and/or identity. Nur chose a card of a little girl standing across a polar bear separated by a glass window (Figure 1). Although Nur did not describe her reactions to the full group, she wrote about it extensively in her online diary:

Nur: At first glance I was worried about the girl's feelings. Wow how scary! Maybe she is crying! Maybe she is scared! Looking more closely I thought, maybe this close encounter with the bear is making the girl feel better about herself, maybe she doesn't feel fear against the great challenge in front of her… This made me think! Why did I choose such a negative view at first sight with all the positivity in my mind?... I imagined that I was the little girl facing a big challenge, standing and watching in full control, and with time, the girl in me will grow bigger and the challenge will become smaller…. [9]

Figure 1: Points-of-You coaching card. (Translated title is "perspective").

Growth and fluidity

Over the next several weeks Nur continued to consider her practices and identity vis-a-vis these ideas. Suggesting that they were growing in importance to her, before the 10th face-to-face meeting she held several private discussions with one of her peers about finally talking publicly during a group reflection session. During the 10th reflection session, she seemed restless—moving in her chair, looking around as if she wanted to talk, but not finding an opening to do so. When the discussion meeting was about to end, Nur mustered the courage to put herself forward, later writing that "I felt I was about to miss my opportunity to be heard" (Week 10 diary). [10]

Guided by the moderator, Nur talked about wanting to be a leader of educational change in Arab society. She talked openly about her place in the KBC where she could not be a leader due to her perception that others were better than her. Nur turned to specific members of the community and described to them how they affected her. [11] For example, she turned to Naomi and said the following, who got up and gave her a hug in response:

Nur: I hear you in the reflection session how you are able to see people. Your thinking is outside the box. Your diary doesn't allow me to be calm. It challenges me a lot. I also want to write this way, I want the ability to interpret things and see them from other vantage points. [12]

In the next face-to-face meeting, after receiving several compliments in her online diary, Nur continued to express her thoughts and feelings with the community during the group reflection session:

Nur: I thought that maybe the group told me good things but maybe some people are not saying anything. Maybe there are negative things. I can accept negative criticism. I think negative feedback can be given, but must be given sensitively. So I invite everyone to give me negative feedback also. [13]

During the 12th face-to-face meeting, the moderator invited the community to raise issues about the collaborative knowledge building process with a focus on things that didn't work well for the community. Even though there were several open issues and challenges in the community, the group remained silent in talking about them. Suddenly, Nur spoke up:

Nur: This week I had a problem in my group...We talked for half an hour… There was no reaction to what I wrote [online]. I disconnected from the phone conversation before it was over. I felt terrible like I haven't for a long time. That my voice wasn't heard. It's like a person who has his mouth taped shut… I sent a whatsapp message… explained how I felt… The next conversation I felt I was heard. [14]

Personal fluidity model

Putting the findings from Nur's story together, we have created a preliminary framework—which we call the personal fluidity model (PFM)—that shows how people's identities in KBCs change in ways that are consistent with the ever-deepening knowledge building principles (Table 5). These are cross-referenced with Nur's utterances as reported in the previous subsections of the findings.

Table 5: Personal Fluidity Model (PFM)

Dimension	Definition	Examples
Fixedness	Little or no awareness or acceptance of challenges being avoided; no acceptance that personal social practices are constructs.	[1] Afraid of being judged [2] Having trouble dealing with challenges [3] Afraid of not meeting one's own expectations [4] Afraid to jeopardize one's intelligence [5] Afraid of being judged; afraid to jeopardize one's intelligence
Steps towards fluidity	Shows some awareness that there may be a gap between how the person perceives others and the way they may perceive him or her; structures are starting to be recognized as ideas, not facts, and are therefore potentially changeable; becoming more expressive.	[6] Recognizing one's own rigidity [7] Wanting to be recognized by the community or others [8] Sharing vulnerabilities [9] Recognizing that responsibility is hers to make a change and that it is possible
Growth and fluidity	Awareness of internal responsibility and taking actions by being authentic; welcoming and trusting the flow of expression; constantly checking oneself with the aim of changing; active exploration of whether perception of personal relationships are accurate.	[10] Acting on a desire to change; overcoming one's fears of external judgement [11] Being congruent with one's feelings [12] Sharing vulnerabilities and being congruent [13] Seeking external information to check inner feelings (reality testing, community alliance, high trust) [14] Acting on internal feelings free from social restrictions

Discussion

In this research we explored how students' identities as knowledge builders change along dimensions of fixedness and growth when they participate in KBCs. The first part of our question focused on Dweck's dimensions mainly dealing with students' beliefs in intelligence, but also in relation to several important dimensions of knowledge building like taking risks and dealing with challenges. Our results did not show any conclusive effect, and if anything were contradictory to our microanalysis of students in action (such as Nur). It is possible that the nature of the questionnaire is problematic and does not accurately reflect the fixedness and fluidity that were more characteristic of students practices and identities. It is also possible that these dimensions were simply not related to the types of changes in students' identities as knowledge builders. This is logical at least with the mindset questions, as the connection between one's belief in intelligence and their openness to experience are, at best, indirectly related. However, given that the changes to the supplementary questions were also contradictory to our microanalytic findings, we are more inclined to think that the nature of questionnaires (at least the type we conducted) is simply not sufficient to capture the deep, often emotional, situated changes that we sought to examine.

The microanalysis of Nur did provide us with results that we think more meaningfully portray fixedness and fluidity in KBCs. At first, Nur perceived herself as not being fully received by others as well as by herself. This appeared to be associated with rigid constructs in her communication and knowledge building practices. Her fear of sharing her authentic ideas and feelings led her to blockages that are described in the first level of the PFM. Having the opportunity to authentically write diary entries as well as hear other students' stories appeared to scaffold Nur's transformation out of a place of fixedness. A noticeable sign of change was seen when Nur became aware of a construct she perceived as a fact and now realized was an idea that could be changed. Her recognition about her fear of being judged with her holding back and not expressing herself fully set in motion a number of small changes in Nur's practices and identity that led her on the path towards fluidity.

Finding the courage to talk openly during the reflection session was a pivotal moment for Nur. By removing her mask and talking about her feelings honestly, she clearly expressed advanced stages of fluidity and openness that were very important for the community. Namely, she broke down some of the barriers that the community was not able to overcome, opening a large discussion about how the group was building knowledge together and undoubtedly helping make the entire community knowledge building process more intentional.

Conclusion

It is possible to call KBCs a growth promoting pedagogy because they encourage continual growth and ever deepening discourse. The results of this research suggest that the movement of students' identities as knowledge builders from fixedness to fluid may be both a result of participating in KBCs as well as highly consequential in improving the knowledge building process. Future research along these lines can help further establish these connections.

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