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Understanding Classroom Roles in Inquiry Education: Linking Role Theory and Social Constructivism to the Concept of Role Diversification

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Abstract

Inquiry-based teaching and learning are rooted in social constructivism and are central to curricular reform. Role theory and social constructivism provided insight into a commonly observed but insufficiently understood phenomenon in inquiry. Within inquiry, role shifts have been described as the switching of roles between students and teachers; however, the process may be better conceptualized as role diversification because students and teachers may undertake multiple roles simultaneously in inquiry. This article expands on existing research and proposes a framework potentially applicable to both learners and teachers, but here focused on learners. Beyond exploration, engagement, and stabilization of roles, diversification was added and described. This framework expanded on current education theory, adding new insight to a minimally explored topic, with implications for students, teachers, consultants, and researchers.

Keywords

inquiry, social constructivism, roles, role theory, role diversification

Inquiry education is central to curricular reform and is based on principles of social constructivism. Inquiry-based curriculum is learner-centered, based on student interests and curiosity (Saunders-Stewart, Gyles, & Shore, 2012), and recommended across subject matter (International Baccalaureate Organization, 2005; International Reading Association, 2003; National Council for the Social Studies, 1994; National Council of Teachers of Mathematics, 2000; National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010; National Research Council, 1996). Several beneficial student outcomes have been identified, including improved achievement, knowledge application, thinking and problem-solving skills, and attitudes toward learning (Saunders-Stewart et al., 2012). There, nevertheless, remain barriers to inquiry implementation (Shore, Aulls, & Delcourt, 2008; Yore et al., 2007), and certain components are not well understood, for example, role shifts. Within inquiry, role shifts occur when a student adopts or takes on a traditional teacher role, such as evaluating his or her own or another student's work. A role shift does not imply adding to the current repertoire of roles but rather suggests that a role is given up or traded and replaced with a new role (Aulls & Shore, 2008; Crawford, 2000). The concept of inquiry-role diversification implies that several roles, including roles not traditionally ascribed to a particular individual, could potentially be adopted at one time.

Several researchers have provided a foundation for research on roles (Moreno, 1961; Turner, 1978), role theory (Biddle, 1986), role acquisition (Thornton & Nardi, 1975; Yellin, 1999), role taking (Selman, 1971; Selman & Byrne, 1974), and role sets (Merton, 1957a). Walker, Shore, and Tabatabai (2013, 2015) concluded that opportunities occur frequently in inquiry classrooms to facilitate adopting multiple and varied roles at the same time. No model yet exists to explain role diversification within inquiry. Although teachers enact multiple roles in the course of a curriculum unit or time period and many of these roles are unique to inquiry-based versus traditional instruction (Aulls & Ibrahim, 2012), no research has addressed as a central part of its model the complexity of roles within inquiry or, in particular, the permutations of role changes or diversification of roles that can occur. Multiple roles and role shifts are visibly present in descriptions of inquiry, but no existing framework explores the various role processes that can occur, including diversification.

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Based on specific tenets from different role theories and from research on inquiry-based teaching and learning, we propose a four-part inquiry framework that can be applied to various age groups. This proposed inquiry framework draws from previous models within role theory but adds new insight into the role-diversification process in particular. Although common in inquiry, there are other classroom settings in which this framework may apply, including discovery-learning settings. Diversification is not as salient within traditional settings. This four-component framework adds the new essential process of role diversification to three other processes that have been described in previous research, specifically, exploration, engagement, and stabilization.

Implicit and explicit classroom rules are learned during exploration, for example, the importance of taking initiative in inquiry classrooms (Thornton & Nardi, 1975). Engagement is characterized by formally learning about what it means to be an inquiry student and beginning to participate in the associated expectations, for example, learning and experimenting with question asking in the classroom (Shore, Birlean, Walker, Ritchie, LaBanca, & Aulls, 2009). Stabilization is characterized by commitment to being an inquiry student, for example, attaining a level of comfort with problems that are not well defined (Shore et al., 2009). During the process of diversification, students adopt varied roles in the classroom, for example, adopting the traditional student role of learner alongside the traditional teacher role of evaluator. There is a theoretical gap when it comes to the concept of diversification, and this article presents an opportunity to better understand the roles that learners and teachers can undertake.

A better understanding of role diversification in the classroom can provide teachers with additional information about individual student progress. Teachers can observe progress in student learning through an awareness of new roles that students take on or adopt, in addition to increased knowledge and skills within the subject matter.

Few articles, if any, have addressed the overlap and connections between the core theoretical knowledge bases of inquiry and role theory. Aulls and Ibrahim (2012) elaborated numerous roles within inquiry; however, they did not focus on the diversification process within inquiry. Thornton and Nardi (1975), Yellin (1999), and Turner (2002) discussed the process of role acquisition but not in the context of inquiry teaching and learning environments, and none referred to a process of role diversification. The proposed framework examined the overlap and connections between role theory and inquiry theory and provided a foundational guideline for further research into the process of diversification.

Social Constructivism and Inquiry

Social Constructivism

In an educational context, constructivism can be described as understanding that occurs as a result of a learner's mental activities. Although an individual actively constructs his or her own knowledge, social interactions strongly influence this process (Bereiter, 1994; Bruning, Schraw, & Ronning, 1995), and social constructivism embraces this process well. Social constructivism describes student learning as well as teaching. Based on Popper's ideas, Bereiter (1994) explained that knowledge or student learning is built on, or improved, through a collective process of creation and construction. Social constructivism, therefore, describes the interconnections among individuals and their social worlds (Ernest, 1995). Developmentally, Vygotsky (1978, 1986) stated that verbal communication among children and between children and adults is a powerful force in helping them acquire conceptual knowledge. Such interaction provides a richer range of use of concepts than an individual might construct on his or her own and provides feedback and scaffolding for that construction. Children learn to speak through dialog and later understand the meaning of speech by making subjective connections among concepts. Children therefore need to be challenged with learning material that they would most likely be unable to complete on their own, but, with help, could learn successfully (zone of proximal development; Vygotsky, 1978). Llewellyn (2002) expanded this by considering internal factors including the learner's prior cognitive experiences that influence the ways in which new information is interpreted and understood. Therefore, knowledge and understanding are in a constant construction and reconstruction process. Smith, Maclin, Houghton, and Hennessey (2000) also described a constructivist classroom as a place where students develop their ideas through dialog with their peers. This hypothesis testing or attempting to make sense of one's own ideas as well as the ideas of one's peers occurs within the classroom, and individuals in this type of classroom can also be considered a community of learners (Brown & Campione, 1994). The teacher frequently scaffolds learning. Teaching in a social-constructivist environment, therefore, needs to encourage knowledge formation and foster skill development, including judgment and organization (Bruning et al., 1995). Teachers act primarily as coaches or facilitators, rather than merely as information transmitters.

Smith and colleagues (2000) considered idea development as a complex process involving multiple steps and also as a collaborative process in which colleagues work together and evaluate each other's ideas. Constructivist classrooms were described as emphasizing group work, dialog, and shared norms. Students described how sharing ideas helps with understanding one's own ideas and also helps create new ideas. Learning was also described as a process of perspective taking and determining the interrelations of different perspectives. This emphasis on learning through social interaction and perspective taking relates closely to the role taking that occurs in inquiry. Role taking in inquiry requires the ability to adopt the perspective of another person in a different role and be able to use that knowledge to enact the role

for oneself. This can involve social interactions with that individual as the person learns about the role they may choose to take on in the future.

Inquiry-Based Teaching and Learning

Inquiry-based teaching and learning classrooms are largely based on social-constructivist precepts and have been a central focus of curricular reform throughout North America and beyond. The National Research Council (1996) defined inquiry as

> a multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results. (p. 23)

Therefore, inquiry broadly involves learning through question asking based on curiosity or interest. This helps create an authentic learning environment that contributes to an individual's inherent motivation to further one's own knowledge (Aulls & Shore, 2008; Robinson & Hall, 2008). Aulls and Shore (2008) emphasized inquiry as an active process, driven by student interest, with knowledge construction as the main goal while building hypothesis formulation and problem-solving skills.

Inquiry-based instruction fosters motivation for independent learning, enhances critical-thinking skills and problem solving, and promotes subject-matter understanding, curiosity, increased confidence, and teamwork (Aulls & Shore, 2008). The International Baccalaureate (IB) program adopted inquiry-based teaching and learning centrally in its curriculum. IB programs were originally developed to provide standardized international entrance exams to university, recognizable in all countries. They provide a challenging education that promotes active learning and cultural understanding with inquiry intended as a privileged pedagogy (Chichekian & Shore, 2014; International Baccalaureate Organization, 2005).

To be an inquirer involves some level of inquiry literacy. Shore and colleagues (2009) described inquiry literacy as the ability to critically understand and also be able to effectively use the language, symbols, and skills of inquiry during an activity. Becoming inquiry literate requires explicit instruction from teachers, parents, or peers, in addition to experience. Some of the indicators of inquiry literacy include the ability to take ownership of one's learning, pursuing one's interests without depending on a teacher, understanding why one is engaged in an inquiry process, seeking relevant evidence, realizing that there are multiple approaches to problem solving, and understanding that learning is a process. Part of being an inquirer or being inquiry literate therefore necessarily involves taking on different roles that students may not take on in a traditional classroom setting, such as the role of question asker, analyst, or communicator. Similarly, Holbrook and Kolodner (2000) discussed the need for students to be comfortable with the active learning that occurs within inquiry classrooms. Specifically, they determined that teachers preferred students to have experience with complex processes (e.g., communication and collaboration) prior to learning concepts within a science classroom. Teacher and student roles were discussed, particularly in regard to the role shift that is common and whereby the traditional teacher role of setting and enforcing tasks is lessened. A "launcher" unit addressed much of the skill development needed for understanding process before content in inquiry. This may parallel some of the characteristics of the exploration, engagement, and stabilization processes because the launcher unit refers to the engagement and development among students of a common language that can become an anchor for further skill development in additional and varied contexts, such as that needed for diversification to occur.

Aulls and Shore (2008) addressed the differences in student and teacher roles in inquiry environments compared with more traditional educational settings. Teacher roles in inquiry were defined as "actions, verbal interactions with students, and responsibilities undertaken to support students' participation in components of inquiry such as projects, experiments, laboratories, hypothesizing" (p. 14). Aulls and Shore proposed that student and teacher roles in inquiry exist along a continuum from roles enacted in teacher-directed inquiry, to teacher-guided inquiry, to student-centered inquiry. In teacher-directed inquiry, the teacher is responsible for student learning; in teacher-guided inquiry, the teacher and students share this responsibility; and in student-centered inquiry, the students take the lead, and the teacher acts as a consultant. In student-centered inquiry, teachers often shift from playing the role of instructor to the role of facilitator, and students tend to move from playing a more passive to an active role in their learning (e.g., sharing in the evaluation of their own work). As opposed to surrendering a role in favor of another, in inquiry, students and teachers may take on additional and sometimes overlapping roles, leading to diversification of their respective role repertoires. Biggers and Forbesa (2012) also recognized the inquiry continuum in terms of teacher and student directedness. Throughout a series of science lessons, early lessons were more student-directed whereas later lessons were more teacher-directed, indicating that movement can occur along that continuum of inquiry. The proposed framework can be applied to all types of inquiry; however, the nature of the roles may differ in each setting. For example, the roles in teacher-directed inquiry may be more similar to roles seen in traditional classroom settings (e.g., the teacher may adopt the primary role of knowledge provider). Overall, there are differences in the types and numbers of roles when traditional classroom settings are compared with inquiry settings and also when various types of inquiry settings are compared among themselves (Aulls & Ibrahim, 2012)

The issues introduced above are elaborated further below.

Role Theory

In inquiry, conceptualization of roles has been limited. Role theory can assist understanding the complexities in this process. Prominent early role theorists, including Moreno (1946, 1961), Mead (1934), and Linton (1936), have investigated this concept since the 1930s and, although this research originated more than three quarters of a century ago, it remains informative. The literature on social constructivism, for example, dates from a similar time, yet it has substantially influenced current curricular reforms. The study of role research and theories does offer advantages; however, the research is often fraught with inconsistent and conflicting definitions, discrepant models, confusion, and a lack of integration (Biddle, 1986). Biddle explained how role theorists differed in their conceptualizations of expectations responsible for roles. For example, some role theorists considered expectations to be prescriptive or based on norms, whereas others assumed expectations to be beliefs or preferences. These differences in expectations may result in adopting roles but for different underlying reasons, and therefore subtle differences in the role expression may become apparent. Biddle also described differences in role theorists' conditions for roles, for example, that roles occur within a social system. Although outlining discrepancies, Biddle summarized how most role theorists assume that the primary force in determining roles arises from social expectations formed through experience and awareness of the expectations for particular roles (Merton, 1957b; Turner, 2002).

Examining the history of role theory from its beginnings offers insights into the evolution of roles over time and can help inform new models related to roles and role theory. Turner (2002), who also wrote about roles earlier (1978), defined a role as a "cluster of behaviors and attitudes that are thought to belong together, so that an individual is viewed as acting consistently when performing the various components of a single role and inconsistently when failing to do so" (p. 233). Turner further described how a person adopts the attitudes, beliefs, and behaviors accompanying a role, and social interaction can facilitate this process and ultimately affect personality formation. Furthermore, individuals may take on multiple roles (Merton, 1957b). Merton (1957a) also differentiated the notion of multiple roles from a role set. A role set is based on relationships that emerge from specific social statuses. For example, a teacher's role set includes students, other teachers, the principal, and professional organizations.

Several variables influence roles and role acquisition. Examining these variables provides further context for the proposed inquiry framework. Role influences include attitudes and beliefs (Kedar-Voivodas, 1983; Kinchin, 2004; Lyons, 1990), norms and expectations (Ryu & Sandoval, 2010; Webb, 2009), experience (Eick & Reed, 2002; Kagan, 1992; Knowles, 1992), and social factors (Chandler & Helm, 1984; Kohlberg, 1969; Reiman & Peace, 2002; Selman, 1980; Yackel, Cobb, & Wood, 1991; Zack & Graves, 2001). Only some of these studies focused specifically on a social-constructivist or inquiry-based teaching and learning context (notably, Eick & Reed, 2002; Kinchin, 2004; Kohlberg, 1969; Reiman & Peace, 2002; Webb, 2009; Zack & Graves, 2001); however, all pointed to the importance of these variables in classrooms, and therefore, they should be considered when developing a framework for student–teacher role diversification.

Role taking has been extensively researched by Selman, who defined the concept as "the ability to view the world (including the self) from another's perspective" (Selman, 1971, p. 1722). Selman added that this skill requires the ability to understand another individual's capabilities, attributes, expectations, feelings, and reactions. Selman and Byrne (1974) later defined role taking as "the ability to understand the self and others as subjects, to react to others as like the self, and to react to the self's behavior from the other's point of view" (p. 803). Role taking within classrooms may not be as clear-cut due to other variables of influence, including student engagement and levels of classroom interaction. Student engagement is dependent on a sense of agency or independence (Engle & Conant, 2002). Herrenkohl and Guerra (1998) examined student engagement, role taking, and social interaction within a science class. Categories of intellectual roles were presented to the teacher and students, who were then responsible for describing and operationally defining these categories: predicting and theorizing, summarizing results, and relating evidence or results to theory and prediction. Intellectual audience roles were assigned by the researchers to one class, but not the others. These roles required that students check each other's work, for example, to ensure that a student assignment contained a prediction. When students took on audience roles, the teacher's roles and responsibilities shifted and most of the cognitive work was distributed among the students. Audience roles required that students ask for clarification to fully understand, and this resulted in more active engagement of the students as they self-monitored and challenged presented information. Students who took on audience roles were more engaged and shared in the construction of knowledge with their peers, which led to a shift in the teacher role toward mediator and monitor within the classroom.

Diversification and Related Constructs

Something is missing in other role-theory models. Diversification is a novel term that differs from the concepts of role shift and role sets. Role diversification involves taking on a larger, more varied number of roles and roles that are not necessarily traditional in nature. Diversification refers to a process of expanding the repertoire of roles that an individual adopts, in number and variety. This overlaps with related constructs but differs in several ways. For example, diversification is not the same as a role shift because a role shift suggests that one role is given up or traded and replaced with a new role (Aulls & Shore, 2008;

Crawford, 2000). In diversification, students may take on several different roles at once and may take on the roles of other parties without giving up existing roles. Furthermore, roles adopted during diversification may be roles that are not traditionally ascribed to that individual, for example, when a student takes on a traditional teacher role of evaluator. Diversification also differs from the notion of a role set or an expected set of behaviors between matching roles, for example, between that of a student and teacher. Diversification allows each person to potentially adopt both so-called teacher and student roles at the same time. This process can be observed over the course of a class, teaching unit, or school year. There are no time constraints in terms of when diversification occurs.

Being able to perceive how another person might respond is not the same as adopting that person's role in that situation. Perspective taking seems to be a necessary but not sufficient component of role diversification. Diversification represents an overarching construct that involves many related constructs, including role shifts, role sets, and perspective taking.

Within inquiry, students have additional opportunities to expand their repertoire of roles. Students take on the learner role, but may also simultaneously adopt an evaluator or question-asker role, and this then influences the existing learner role so that roles are constantly evolving. For example, when a teacher stops a lesson and prompts the students to ask questions, the teacher is now encouraging students to adopt a question-asker role, thereby shaping their learning experience and their existing role as learner. Creating opportunities for adopting diverse and varied roles happens often within inquiry classrooms. Gyles (2011) examined students' frequencies of reported experiences with 23 criterion-referenced student-inquiry outcomes (Saunders-Stewart et al., 2012; Saunders-Stewart, Gyles, Shore, & Bracewell, 2015) and concluded that even moderate levels of inquiry use led to the adoption of new student roles.

Inquiry Framework

The proposed framework is not a stage model but involves several processes of individual evolution and change that build on one's own individual repertoire of inquiry skills and roles. Students can adopt a number of different roles and do so in a unique and evolutionary way. Diversification may actually be observed within the processes of exploration, engagement, or stabilization.

Role-Acquisition Models and Links to Inquiry

There are several role-acquisition theories; however, none has specifically focused on an inquiry-learning environment. Three existing role-acquisition models are reviewed. Two of these models are presented primarily as stage theories; however, the proposed framework does not incorporate this perspective.

Fundamental concepts from the reviewed models form the basis for the proposed inquiry framework, with the exception of diversification. Descriptions of how individuals transition between different phases of role acquisition are limited. Links to inquiry can be identified, permitting creation of a proposed framework to explain common processes that occur within inquiry classrooms. Role diversification can occur in any environment; it does not occur exclusively in inquiry, however, there are numerous characteristics of inquiry environments in which role diversification is relevant and essential. For example, Shore et al. (2009) identified several inquiry characteristics that involve a certain diversification of roles. As an example of essential inquiry-student knowledge, they characterized inquiry as goal-driven, with shared objectives among students and teachers. This requires others' collaboration to negotiate a consensus regarding the learning goals. These negotiation skills require active engagement and may therefore necessitate a role shift from passive recipient to active collaborator. In addition, an essential student skill required for inquiry literacy is the ability to ask relevant questions, both for oneself and for an appropriate audience. Doing the latter requires adopting the role of presenter or question asker, and also the role of audience member to ensure that the question will be relevant and nontrivial, therefore, illustrating role diversification.

Bracewell, Le Maistre, Lajoie, and Breuleux (2008) examined role shifts in inquiry, specifically, changes in six teachers' knowledge and beliefs in a technology-driven teaching environment. Technology in the classroom allowed students to take on more active and differentiated learning roles. Although teachers were initially concerned about the greater autonomy provided to students through technology, these concerns eventually faded and the increased student independence led to a change in teachers' own perspectives toward teaching and learning. This was labeled *release of agency* and defined as "the psychological decision that accompanies (indeed, allows) a teacher to make the well-documented change in roles from a didactic instructor to a coach who facilitates student academic inquiry" (Bracewell et al., 2008, p. 292). Success meant that teachers had to be comfortable with the changes spurred by technology in their classrooms. Although this research specifically focused on the introduction of classroom technology, it identified several ideas relevant to inquiry, including the "release of agency" concept that parallels the role-diversification process.

Similar to competing theories for roles, there are several role-acquisition models, none of which has been widely accepted (Yellin, 1999). Synthesizing these theories and focusing on links to inquiry provided the impetus for the proposal of a coherent and comprehensive inquiry framework that includes the process of diversification. Only three role models most relevant to inquiry are presented.

Thornton and Nardi (1975)

Thornton and Nardi defined a role as behavioral, attitudinal, and cognitive expectations imposed on a person within a particular social position. They outlined a four-phase progression

of role acquisition whereby individuals move from passive role acceptance to active role engagement. During the anticipatory phase, individuals begin to socially and psychologically prepare themselves for the new role and have a general notion of what will be required based on stereotypes. In an inquiry environment, students with minimal inquiry experience may enter a classroom with preconceived notions of traditional classroom values (e.g., predominantly teacher-directed in which the majority of class time is in lecture format), potentially leading to more difficulties adapting to their new inquiry environment. Inquiry students are often expected to make certain curricular decisions, evaluate evidence, and take initiatives in their learning (Aulls & Shore, 2008).

In the formal phase, individuals view their role from a more internal perspective. Formal written rules or duties replace initial stereotypes. Although Thornton and Nardi believed that this phase implied a high degree of consensus, this may differ greatly in an inquiry classroom. Rules or duties in a traditional classroom setting are often overtly stated and can include listening to the teacher and remaining seated unless told otherwise. In an inquiry classroom, these rules can be quite different, for example, asking questions, listening to your peers, and challenging evidence. A student unfamiliar with inquiry and who expects to sit quietly and listen to the teacher without questioning any of the information may be uncomfortable with the new expectations to be more actively involved in the learning process.

During the informal phase, individuals begin to learn the new role's informal rules generally understood through interactions among individuals within the system. Increased conflict and decreased consensus regarding different formal and informal expectations characterize this phase. In an inquiry environment, a student expecting to sit and listen to the teacher may have trouble asking questions, working as part of a team, or hypothesizing, especially if that individual is shy. Once the student begins to adapt to this new environment, he or she might encounter the informal rule of politely interrupting if one has a good idea during a discussion. This may not be as difficult for the student to accept if he or she has learned formal inquiry rules, such as asking questions or generating hypotheses.

In the personal phase, individual characteristics, including personality, past experiences, unique skills, and cultural beliefs, may affect the role. Individuals also modify the role by imposing their own expectations to better fit their personality. This relates well to role diversification, because it recognizes the changing nature of roles and acknowledges the possibility for adopting new role behaviors.

Yellin (1999)

Yellin aimed to better understand role-acquisition dynamics and also considered a role to be a set of expectations based on behaviors, attitudes, skills, and knowledge, and that individuals influence expectations through modification and negotiation. Yellin proposed that transitions between phases of role acquisition are marked by specific events that signify a move to the next phase and, at these points, individuals would have a different understanding of the role.

In the first phase, ambivalence, individuals are exposed to a new social network, and therefore have a vague conception of what is expected in the new role. This can lead to role ambivalence or role disorientation. Individuals unfamiliar with inquiry may be overwhelmed by the changed expectations in this context compared with a traditional setting.

In the second phase, absorption, individuals familiarize themselves with the new role through repetition, negotiation, and performance. Individuals begin to learn specific behaviors and expectations of the role very quickly, leading to changes in self-image. The individual in the new role may feel overwhelmed or frustrated. This phase explains a workplace context well; however, it may not describe an inquiry educational setting as effectively because inquiry roles are highly individualized based on student interest.

In the next phase, commitment, an acceptable performance in a particular role has already been attained and therefore the person often receives positive feedback from others in similar roles. Individuals identify with the role and commit to it leading to enhanced self-worth. The role becomes a part of the person. Yellin noted that, at this phase, conflict is also common because, when an individual accepts that he or she is undertaking a new role, it may not match the individual's previously existing roles. For example, the role of organizer at school may conflict with a disorganized environment at home. This is relevant to inquiry in which role diversification involves taking on multiple roles; however, it differs in that these multiple roles are usually adopted in one setting.

In the final phase, confidence, the role becomes predictable and confidence increases. The individual is able to anticipate and plan responses in advance based on others' expectations. Although this can reduce anxiety, it can also lead to boredom because there are only slight changes or performance variations in the role. The struggle in this phase therefore becomes finding methods to renew motivation, for example, adding responsibilities to the role or taking on a new role. This is relevant to inquiry environments, known to foster motivation in students, perhaps due to the role diversification that occurs in inquiry, leading to new challenges and promoting excitement when novel roles are enacted.

Turner (2002)

Turner (2002) detailed several characteristics that related well to role acquisition. Interactional theories assume that role behavior derives from social interactions and that roles are broader and represent a "comprehensive pattern for behavior and attitude that is linked to an identity, is socially identified more or less clearly as an entity, and is subject to being played recognizably by different individuals" (p. 234).

This may be relevant to a more open-ended context such as inquiry, in which students and teachers can engage in multiple roles simultaneously. Expectations and interactions with others shape the role acquisition. Roles are learned through observations made as children, and are learned in sets or pairs, for example, the roles of student and teacher. When individuals in the set learn about each other's roles, role transitions are facilitated. Depth of roles can vary: They tend to persist, be difficult to change, and require extensive support during transitions. This may explain why some students struggle when newly engaged in inquiry. If we can learn more about role diversification, we can better support students during these transitions.

Specific to role acquisition is Turner's role-allocation concept: The individual works toward a certain role while others either facilitate or hinder his or her progression, which then invokes a negotiation process. For example, if a student asked a genuine question in class but during an inappropriate time, the teacher may chastise this student as disruptive rather than view her or him as inquisitive, hindering acquisition of a questioner role.

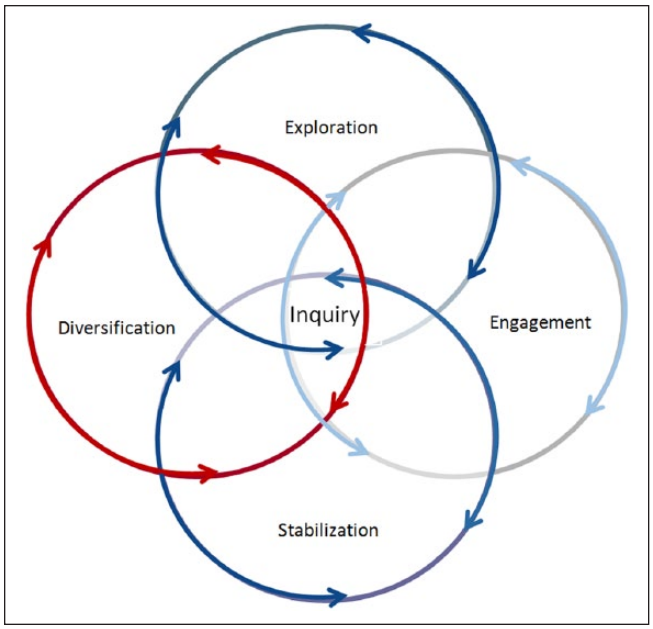


Figure 1. Visual representation of proposed inquiry framework containing four processes of engagement, exploration, stabilization, and diversification.

Proposed Four-Process Inquiry Framework

Having a framework to help explain common processes in inquiry can provide methods to better support students and teachers in implementing this form of education. As previously highlighted, one must take into account attitudes and beliefs, behaviors, norms, expectations, previous experience, and social factors. In addition, the inquiry continuum is an essential consideration because inquiry classrooms will look different depending on whether they are more teacher-directed or student-centered, and this can therefore influence role processes in inquiry. Student-centered inquiry classrooms may be more facilitative of role diversification than teacher-directed inquiry classrooms. Another key variable that several models have not addressed is the individual's developmental level, which becomes especially applicable in school settings.

Framework processes are described predominantly from the student's perspective for the sake of simplicity; however, teachers or other individuals in the classroom system may also undergo similar processes in an inquiry environment. Several of the models previously described focused heavily on the cognitive components of role acquisition and diversification, whereas the proposed framework emphasizes both cognitive and behavioral components. Based on the above models, an inquiry framework is proposed, including the processes of exploration, engagement, stabilization, and diversification. This is not a stage model wherein each process necessarily follows chronologically. Diversification can take place in a nondevelopmental manner if the inquiry classroom facilitates the process. Within the proposed framework, diversification has the potential to emerge in the context of exploration, engagement, or stabilization. For the most part, the process of diversification builds on skills acquired during the stabilization process that builds on skills acquired during the engagement process, which in turn builds on skills acquired during the exploration process; however, these processes can and do overlap. The process of engagement may occur at different rates, or a student may experience stabilization prior to engagement in certain inquiry situations (e.g., one student might be very committed to working within a collaborative group before fully engaging as an individual in inquiry). Furthermore, a student can gain some practice with diversification during the exploration process when general inquiry rules and expectations are being introduced. These processes are, therefore, adaptable in terms of the timing of their occurrence (see Figure 1).

Exploration

Inquiry classrooms often run against teachers', students', and even parents' expectations, which heavily influence roles and role acquisition. As supported by Thornton and Nardi (1975), exploration involves learning about the implicit and explicit school and classroom rules as they pertain to inquiry in addition to different roles that are possible in inquiry classrooms. Shore et al. (2009) identified elements of student knowledge essential to inquiry success and suggested that inquiry can occur without an abundance of specific formal information; however, students do require pertinent language, symbols, and skills to be considered inquiry literate.

Unlike more traditional classrooms in which students have some idea of what to expect, an inquiry classroom contains several differences that might run counter to students' initial

expectations about their different roles as students coming into the classroom. For example, some students expect to learn and memorize facts instead of generalized skills that can be applied in many different settings (Bramwell-Rejskind, Halliday, & McBride, 2008). This is also partially consistent with Yellin's (1999) conception of the ambivalence phase in which an individual only has a vague idea of what to expect in the new role. Similarly, Yellin highlighted the challenges of continuing in the new role once motivation is lost. This idea is relevant to students who struggle adjusting to an inquiry environment, and this may lead to underachievement.

Conflicting expectations may make it more difficult for students to initially engage within an inquiry-student role. This also depends on the teacher's inquiry experience and how well the classroom is structured based on the students' prior inquiry experience. As a hypothetical example, consider Emily, a fifth-grade student beginning her very first inquiry-based unit on the environment. Her teacher has just presented information about the qualities that will be expected of students throughout the course of the upcoming unit, including taking risks and exploring new ideas. Emily has never heard of some of these inquiry qualities and begins to feel overwhelmed by these initial expectations. The assignment for the day is to work with a partner to choose one of the described qualities and select a magazine image that illustrates that quality of an inquirer. Emily does not know many students well, and she is the last student to choose a partner. After 5 min, Emily and her partner have still not decided which quality they should choose. The teacher announces that it is time to present their image to the class, and Emily begins to feel anxious because they are not finished.

This example illustrates how exploration involves learning about an inquiry setting and how the role expectations in these environments may differ dramatically from role expectations in a traditional classroom setting. For example, Emily not only had to make her own partner selection, but she also was responsible for choosing the assignment theme and image. This activity required initiative, teamwork, communication, and creativity. These differing role expectations can create challenges for some students, at least at particular times.

Engagement

Engagement is a process in which the inquiry student begins to formally adopt and engage in an inquiry-student role, such as a question-asker role. The pupil also begins to learn about specific obligations that are expected of an inquiry student, for example, generating questions, taking initiatives, listening and discussing respectfully, organizing information, and interpreting data effectively for oneself and others (Shore et al., 2009).

Samarapungavan, Patrick, and Mantzicopoulos (2011) examined the development of inquiry process variables within a kindergarten population and also the impact of science-inquiry activities on student learning and motivation. The Science Learning Assessment–Version 2 (Samarapungavan, Mantzicopoulos, Patrick, & French, 2009; Samarapungavan et al., 2011) was administered, and this assessment included items addressing student's understanding of inquiry processes and content. They also differentiated between pre-inquiry, inquiry, and post-inquiry phases. Pre-inquiry activities were described as "whole class activities that are meant to activate children's prior knowledge, introduce the purpose of the investigations, and provide children with the framework for tasks at hand" (Samarapungavan et al., 2011, p. 431). This resembles the engagement process of the proposed framework. The inquiry phase involves active involvement in inquiry activities and post-inquiry activities refer to reflection on learning and sharing what was learned with others. With appropriate scaffolding, Kindergarten pupils developed complex understandings of the processes required to engage in scientific inquiry.

Conflict may arise during the engagement process when traditional student-role expectations are contrasted with the expectations of an inquiry-student role. For example, some students do not believe that they should have input on curricular content (Wolf & Fraser, 2008). In other cases, inquiry expectations and cultural beliefs or values may conflict. For example, Chinese students may consider questioning the teacher as being disrespectful (Li, 2003).

Engagement is similar to previously described models but also differs in critical ways. Matching Thornton and Nardi's (1975) beliefs, prior expectations influence the engagement process; however, consensus levels may differ. Thornton and Nardi conceptualized their second phase as involving a high degree of consensus; however, in inquiry, engagement may involve some degree of conflict when expectations do not match the inquiry classroom's reality. Thornton and Nardi's model may apply better to work environments in which a high degree of role consensus is expected or even necessary, at least during the enactment or carrying out versus the planning of work. Disagreements in inquiry occur often and can sometimes be advantageous when they lead to a leveling of intragroup power relationships and improvement in understanding another individual's perspective (Barfurth & Shore, 2008). Although Yellin's (1999) model was well suited to specific workplace settings, the element of learning specific role behaviors in Yellin's absorption phase is similar to inquiry engagement.

Continuing with the hypothetical example of Emily, her class is now well into the environment unit. Emily has learned a lot about how an inquiry classroom functions. The most recent assignment involves working in a small group to brainstorm different ways to recycle or re-use common household items. A member of Emily's group asks her if she has any ideas. Emily describes how she saves yogurt cups for organizing her beads. Her group members excitedly write down her creative idea, and later Emily asks a question to one of the members about his idea for recycling and reusing items from

home. In this part of the example, Emily begins to learn the value of question asking and discussing respectfully in a team setting, indicating she is demonstrating engagement.

Stabilization

Stabilization involves solidifying a student or teacher's commitment to working within an inquiry classroom. It occurs once the individual has explored various inquiry-role expectations, he or she has found it to be a positive experience, and then he or she has fully engaged in its expectations. At this point, inquiry-literate individuals positively value collaboration, are comfortable with problems that are not well defined, look for patterns across knowledge areas, think imaginatively and critically, and acknowledge multiple solutions to problems (Shore et al., 2009).

As in Turner's (1978, 2002) interactional role theory, interactions among those who have committed to inquiry influence the role-acquisition process. Thornton and Nardi (1975) considered the informal phase to feature increased conflict; however, in inquiry, due to the struggle experienced during engagement, students' conflicting sentiments will most likely be resolved before experiencing stabilization. Emerging inquirers will usually have already experienced differing expectations and may have accepted a certain level of uncertainty. According to Yellin's (1999) commitment phase, the role becomes a part of the individual's identity. Yellin's assertion that this phase is characterized by increased conflict may also be more relevant to diversification, when the individual adopts multiple and varied roles. Perhaps the content and nature of the conflicts might be different.

Within Emily's classroom, the students are working on another unit activity, and have been asked to write a hypothetical letter to the mayor of the city proposing a new way for the city to help protect the environment. With the new inquiry skills Emily has been learning throughout the unit, including researching online and obtaining input from a fellow classmate, she has proposed a yearly event in which members of the community join together to collect litter, followed by a barbecue fund-raiser. The money raised will be invested in purchasing environmentally friendly products for local businesses. After finishing the assignment, Emily began researching the possibility of making this proposal into a real community event.

In this example, Emily fully engaged in the assignment and, through collaboration but also independence, Emily developed an ambitious idea that she continued developing even after the assignment was completed. Emily has more comfortably taken on a number of the actions and expectations associated with being an inquirer.

Diversification

Once a student has achieved a certain level of comfort and commitment as an inquiry student, a more complex process may emerge that involves adopting additional and varied roles within the classroom. This involves conscious risk-taking, because it is inherently more complex. There is also a more complex social component involved when taking on the role of another person. If one is engaging in another person's role who is in a position of authority (e.g., teacher or team leader among students), this can also be intimidating and therefore a disincentive to diversify a role. For example, the student in addition to a learner role may now also take on a hypothesizer or explorer role while the teacher may adopt additional learner or partner roles (Aulls & Ibrahim, 2012). Comfort with each role on an individual level allows for the more complex process of diversification to occur. Appropriate scaffolding from the teacher or from other students is critical to success here. The teacher is responsible for ensuring that students will be successful in the roles they adopt. This can be overwhelming and this process, in particular, often represents what has been previously conceptualized as the role shift in inquiry (Aulls & Shore, 2008; Crawford, 2000). Although the above processes were primarily described from a student's perspective, teachers may go through a similar process when engaging in inquiry.

Diversification differs from stabilization because one may commit to a role simply because it is appealing or enjoyable; however, diversification occurs once a student has felt comfortable enough or has become bored with a particular role. Diversification and stabilization can therefore overlap. Within Emily's classroom, the students have been working on their summative unit activity. In small groups, students have been asked to prepare a short presentation for a younger audience about the importance of recycling. The group members have collected pertinent information and are now deciding what information to present. As one student is describing the information she would present, Emily asks her how she might make the information easier to understand for the younger audience. The group members then engage in a discussion about how the information can be meaningfully presented. This is an example of diversification because Emily has not only taken on the role of presenter, but she has also engaged in the role of an audience member by imagining if someone younger would be able to understand the presented information. Later, Emily's teacher walks by and asks Emily to further explain her section of the presentation because this was something she had never heard before. This is an additional example of diversification because Emily has taken on the roles of student and teacher, while the teacher has now also taken on a learner role.

Social interaction and dialog are key qualities of an inquiry environment, and they influence the diversification process. For example, observing other students participating in the process of diversification might model the process, therefore possibly facilitating their own diversification process.

Also relevant to inquiry diversification is Turner's (2002) functionality principle in which there is a distribution of responsibilities among individuals who adopt different roles based on their skills, knowledge, and diversity. For example, in a group, each student may have specific or unique skills,

and with increased decision-making power in inquiry, members may decide that each person will adopt a specific role to accomplish the task, including recorder, investigator, or presenter. In addition, Turner recognized that when individuals learn about each other's roles, role transitions are facilitated. This may also apply to adopting new or additional roles.

Thornton and Nardi (1975) recognized the importance of individual characteristics in their final role-acquisition phase, the personal phase. They acknowledged variability within roles due to the influence of expectations from previous experience, cultural beliefs, and personality. This also applies to role diversification and influences which additional roles each student adopts. Diversification differs from Yellin's (1999) final confidence phase in which roles become predictable. In an inquiry environment, the student's role is always changing because it expands and incorporates several different roles. Yellin also accepted that a predictable role can lead to boredom and decreased motivation. Focusing on student interest in inquiry somewhat protects against these problems and facilitates motivation in the classroom, making it advantageous, especially during diversification (Aulls & Shore, 2008). Diversification is more consistent with Turner's (2002) interactional theory due to a role's changing nature as well as the possibility for role creativity, which becomes a reality during this phase. Turner also recognized that some roles are resistant to change. Perhaps this helps explain why some students struggle in inquiry. If they experience difficulty during any of the above processes, they may struggle in a setting in which role diversity is embraced.

Conclusion

Theory is important to practice and provides a foundation for understanding complex phenomena. By reviewing tenets from role theory and role acquisition, a new or expanded framework was proposed that included a previously missing conceptualization, namely, inquiry-role diversification. The present article offers a theory-based framework to help understand this process, applying tenets from role theory to a specific process common in inquiry-based learning environments, namely, diversification. Better understanding of inquiry processes is important because inquiry education is central to numerous, ongoing, curricular reforms. Based on social-constructivist principles, inquiry can greatly improve the learning environment. Currently, several inquiry phenomena are not fully understood, including role diversification that is frequently observed, but not well described.

Our proposed framework for inquiry roles contains four processes: exploration, engagement, stabilization, and diversification. During exploration, implicit and explicit inquiry classroom rules are learned. Engagement is characterized by formally adopting and learning specific role expectations of being an inquirer. Stabilization is characterized by commitment to being an inquirer. During diversification, individuals adopt different, additional roles in the classroom. Limited research has been conducted on these processes, and the proposed framework provides a previously unavailable conceptualization of this complex phenomenon.

Limitations

Although the proposed framework for inquiry roles incorporated and synthesized several role-related tenets and was based on role theory, additional empirical evidence examining each process and its specific characteristics is needed.

Implications

Teachers and students. A deeper understanding of role diversification can provide teachers and students with a better sense of success in inquiry environments. Success in inquiry is measured differently, and not all students always achieve their full potential in inquiry classrooms. However, if greater knowledge is gained regarding roles, role acquisition, and particularly role diversification, then strategies can be developed to help facilitate transitions for students who are struggling to adapt to inquiry's role-diversification challenges.

Furthermore, better understanding of these complex processes will help improve evaluation criteria within inquiry. If students better understand how learning occurs within inquiry, this may contribute to a sense of empowerment, rather than frustration in inquiry. For example, if a student is struggling to meet an assignment deadline, but is working hard on a topic of interest, this student might be penalized within a traditional classroom setting. However, in inquiry, this student could be considered to be experiencing stabilization, a very positive and advanced learning process.

Consultants and educational developers. The proposed framework has multiple implications for school psychologists, counselors, subject-matter consultants, and other professionals because it presents a developmental understanding of a central phenomenon in inquiry classrooms. Specifically, this research carries implications for assessment, and in planning interventions for struggling students. As inquiry becomes increasingly central to curricula, classroom environments are changing. The inquiry setting can be quite different from a traditional classroom; it can often be busy and noisy due to students' enthusiasm about playing a much more active role in their learning. Examining student roles in the classroom and how these might affect learning would be a useful tool during classroom observations for students with learning difficulties.

A consultant or educational developer's view of typical behavior in the classroom might need to be altered considerably in inquiry environments. Typical behavior in inquiry classrooms (e.g., students actively investigating their own

educational interests) might be considered inappropriate or dysfunctional in a traditional classroom setting. Properly comprehending inquiry phenomena, for example, role diversification, in which the student may take on teachers' roles by challenging presented information and asking questions, will lead to a better understanding of what should be considered appropriate classroom behavior. The same applies to what constitutes success in a classroom. Conditions for success vary considerably in an inquiry context. Success on an inquiry task may not be based on the outcome alone, but perhaps also on how much the student persevered or took on additional roles to investigate the concept.

In addition, students often act out because they are bored. Such behavior may be decreased in an inquiry setting in which learning is shaped by students' interests. Furthermore, inquiry regularly requires group problem solving and disagreements can therefore occur often, but these can lead to important social and cognitive gains (Barfurth & Shore, 2008). Such interpersonal disputes should not necessarily be considered dysfunctional. Overall, the classroom context has a huge impact on student and teacher behavior.

Researchers. This review has implications for plotting the growth of inquiry in a classroom, school, or among teachers and students. For example, if a student is experiencing increased conflict in the classroom, perhaps this suggests that the individual is experiencing engagement or even stabilization and not necessarily failing or underperforming in the inquiry setting. In addition, researchers could focus on the four processes of inquiry in future studies about classroom interactions. For example, it might be possible to develop a qualitative checklist for a classroom observation based on the descriptions of each process; however, further empirical research will be required to validate the proposed theoretical framework.

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