

## Individual Learning and Performance in Communities of Practice

Zeying Wan

Richard Ivey School of Business  
The University of Western Ontario  
London, On., N6A 3K7, Canada  
[zwan@ivey.uwo.ca](mailto:zwan@ivey.uwo.ca)

Yulin Fang

Department of Information Systems  
City University of Hong Kong  
83 Tat Chee Avenue, Hong Kong SAR  
[yifang@cityu.edu.hk](mailto:yifang@cityu.edu.hk)

Derrick J. Neufeld

Richard Ivey School of Business  
The University of Western Ontario  
London, On., N6A 3K7, Canada  
[dneufeld@ivey.uwo.ca](mailto:dneufeld@ivey.uwo.ca)

### Abstract

*This study examines the relationships among individuals' involvement in Communities of Practice (CoPs), learning, and job performance. Drawing on the CoP and learning literatures, we develop a theoretical model exploring how individuals' involvement in CoPs affects their learning and job performance. The model is tested using survey data collected from graduate students in a large Canadian university. Results support the hypothesis that CoP involvement is related to learning, and reveals a complex relationship between learning and job performance.*

### 1. Introduction

It is widely acknowledged that knowledge is a strategic resource that organizations can use to achieve competitive advantage [1]. Building, sharing, and integrating knowledge, and fostering continuous employee learning, have thus become important concerns for contemporary organizations [1-3]. The community of practice (CoP), defined as a group of people informally bound together by shared practice, experience, and expertise for a common enterprise, have risen as one major solution for enhancing learning in organizations [4, 5]. Many corporations have promoted and benefited from cultivating CoPs, albeit under different names [5-7] such as “learning communities” at Hewlett-Packard, “family groups” at Xerox, “thematic groups” at the World Bank, “peer groups” at British Petroleum, and “knowledge

networks” at IBM Global Services, to name a few [8].

In addition to the practical interests in CoPs, academic interest has also been mounting, and early research has identified several core “characteristics” of CoPs [5]. However, to date only limited research has attempted to explore potential interrelationships among CoP characteristics. Thus, our first objective is to answer the research question: *How are core CoP characteristics interrelated?*

Recent research has investigated the role of CoPs in knowledge management, knowledge diffusion, knowledge transfer [7, 9, 10], innovation capabilities [11], interaction with information technology (IT) support personnel [12], best practices [5], formulation of knowledge strategy [13], and ultimately competitive advantage [14]. While most of these studies have suggested that CoPs are instrumental in empowering employee learning, empirical research examining the link between CoPs and individual learning is very limited. Thus, our second research question is: *To what extent does CoP involvement influence individual learning?*

Because learning leads to superior individual performance [3, 15], building a learning environment inside organizations is an important concern for today's practicing managers. Once again however, little research (especially quantitative research) has examined the effect of CoP-related learning activities on job performance. This constitutes the third research question in our study: *To what extent does learning within the CoP context influence individual job performance?*

Drawing from the CoP and learning literatures, our study proposes a research model to examine the relationships between individual CoP involvement, learning, and job performance. We develop and validate measures for CoP characteristics, and then use a field survey to explore how these characteristics are related to learning and performance. The findings contribute to the literature in several ways. First, the paper advances theoretical understanding and empirical evidence for the interrelations among core CoP characteristics. Second, this paper offers validated measures for CoP characteristics on which future research might be built. Third, this study is among the first to quantitatively examine the effects of CoPs on individual learning and performance, thus providing a different angle on the CoP phenomenon.

## 2. Literature

The term “community of practice” was first coined by John Seely Brown, a researcher in Xerox’s Palo Alto Research Center (PARC) in the 1980s<sup>1</sup>. The term has since been popularized by Lave and Wenger [16] and Brown and Duguid [11], and extensively discussed and developed in the literature [4, 8, 11, 16-18]. For the purposes of this study, a CoP is defined as a group of people informally bound together by shared practices, experiences, and expertise for a common enterprise [4, 5].

Numerous studies have attempted to distinguish CoPs from other similar organizing forms, such as teams [4], organizational units, or communities of expertise [12], actor-network [19], knowledge networks, virtual communities [18], and *ba* (i.e., a shared space for emerging relationships) (Nonaka and Konno 1998). A common conclusion from these efforts is that a CoP is not a new type of organizational structure, but rather one that emphasizes different individual outcomes, such as joint learning [9]. A CoP is defined by the knowledge domain occupied by its members, rather than by the nature of the tasks or projects it performs. The community’s boundary is determined by its members’ perceptions of identity (determined by the culture and history of the community), not by job requirements or project goals. Furthermore, while membership in a CoP is typically flexible and voluntary, it can take time for a new member to learn about the community and become a full participant [20].

CoP members learn from one another through natural interactions, rather than through repetitive organizational routines, and their learning activities tend to go beyond the information sharing that occurs

in virtual teams. More importantly, through a process referred to as “legitimate peripheral participation” [16], CoPs provide a unique learning environment for their members. This notion of situated learning through interpersonal participation is what fundamentally distinguishes CoPs from other groups [16, 21]. This perspective has emerged as an important complementary theoretical perspective to the inherent and property-based classification of knowledge [21]. Instead of classifying knowledge into different types (e.g., tacit versus explicit), the practice-based perspective advocates an integrated approach that proposes a view of knowledge as process-oriented and dispersed [22-24], and something that is a natural outcome of people getting their work done [4, 16, 21]. It proposes that understanding learning and knowledge-building behaviors require understanding *shared practices* within a community, that is, the common activities of members in doing real work as it is informed by a particular working context [21]. Thus, learning is not separable from practice; instead, it is situated, embedded, and inherent in human actions [23, 25].

In that case, what are the key characteristics of a CoP? Some researchers have adapted the original definitions provided by Wenger and his colleagues [4, 16], while many others have constructed new definitions using a variety of different perspectives. Approximately fifteen characteristics of communities of practice have been highlighted in the literature [26]. We further conducted a keyword search for “communities of practice” in the ProQuest and IEEE databases, and sought different definitions of CoPs. We discovered that very similar core characteristics of CoPs were expressed in the various definitions. In particular, three characteristics of CoPs were frequently mentioned: mutual engagement, shared repertoire, and joint enterprise [4] (Table 1).

**Mutual engagement** is defined as the extent to which people in a CoP are collectively exposed to and work on a common class of problems through informal interaction [4, 27]. Wenger [4] describes mutual engagement as the “how it functions” dimension of CoP. The notion of mutual engagement suggests that practices do not exist in the abstract, but come into existence through interpersonal interaction [27]. It emphasizes the concrete activities conducted in CoPs for the purpose of solving problems and sharing and building knowledge. Meanings behind practices are acquired over time, through ongoing negotiation and interaction among participants of the practice. For instance, in one study photocopier repair technicians were found to acquire their repair strategies for addressing unexpected, non-documented problems primarily through the telling and retelling of past success stories [28]. From this

<sup>1</sup> <http://ontology.cim3.net/cgi-bin/wiki.pl?CommunityofPractice>

perspective, it is through an ongoing interaction of solving problems that knowledge gets shared and developed and the members' perceptions of mutual engagement gets reinforced.

Table 1. Three Characteristics of CoPs

Ref.	Mutual Engagement	Shared Repertoire	Joint Enterprise
[29]	Situated learning and action	Distributed cognition	Social infrastructure with a joint purpose
[11]	Solving problems through interaction	Historical solutions and practices	Informal groups with common interests
[8]	Sharing similar work roles and a common context	Shared expertise	Joint enterprise
[30]	Engage in knowledge building through communication	Shared meaning	Informal networks glued by a set of shared concerns
[18]	Developing and sharing knowledge	Shared learning environment	A socio-technical system with a common interest
[16]	Social interaction	Common language; shared practice; situated learning	Shared identity
[17]	Sharing and learning	Long-term organizational memory	Common interest
[10]	Mutual engagement	Shared repertoire	Joint enterprise
[31]	Sharing knowledge and learning from and with each other	Shared meaning around work practices	Common purpose, culture, and timeframe
[4]	Mutual engagement	Shared repertoire and resources, common practice	Joint enterprise
[5]	Mutual engagement	Shared expertise and knowledge	Joint enterprise
[9]	Shared knowledge and learning	Common practices	A set of relations tied together by a common purpose

**Shared repertoire** is defined as the extent to which people in a community share the historical, social, and physical resources of the community that sustain and shape mutual engagement in action (i.e., the “what is possessed” dimension of a CoP) [4, p.5]. Resources include any means used to accomplish work, including routines, roles, procedures that shape task interactions, physical and conceptual tools such as stories and organizational memories that trigger particular approaches to tasks, technologies to

accomplish work, and terminology that is produced or adopted [27]. Shared repertoire is developed through mutual engagement and thus reflects the “historical sediment” of the mutual engagement [4, p.13].

**Joint enterprise** refers to the extent to which people in a community hold a common identity and a mutual accountability to those involved in the same community (i.e., the “what we are about” dimension of CoPs) [4, 27]. In other words, joint enterprise is an implicit and common identity developed through the process of community participants experiencing and finding meaning in what they do [4]. It is the participants' negotiated response to their situation and thus belongs to them in a profound sense. The feelings of belonging (to a group, network, a set of relation, or joint enterprise), identity, and commonness that have been expressed in varied definitions show that joint enterprise is an important characteristic of CoPs. This characteristic reflects a sense of shared values and purposes or interests related to the community's activities. It distinguishes a CoP from other kinds of groups as well as from other CoPs. It also helps members sort out what they should pay attention to, what they should participate in, and what they should stay away from. It is the premise for the existence of CoPs and determines the CoPs' life cycle.

In the next section, we build an individual-level research model to hypothesize how joint enterprise, mutual engagement, and shared repertoire are interrelated and how they affect individual members' learning.

### 3. Hypotheses

The following model suggests that the three characteristics of communities of practice are interrelated, and jointly determine individual learning outcomes. The model also suggests that individual learning outcomes lead to job performance. Figure 1 illustrates the research model.

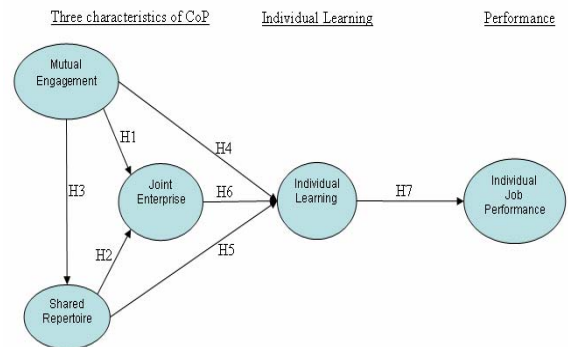


Figure 1. Research Model

### 3.1. Mutual Engagement, Shared Repertoire, and Joint Enterprise

The CoP literature suggests that mutual engagement through interpersonal interaction is an essential activity that allows community members to participate in social practices [4]. Members develop a sense of “sameness” through interactions that center on a common class of problems or concerns. Prior research on intra-organizational communication has shown that interpersonal communications can also increase a sense of common identity among organizational members. This is because communication can provide members with an opportunity to share their subjective interpretations about the organization’s values and norms [32], which in turn creates a feeling of shared meaning [33]. Consequently, shared meaning strengthens the members’ sense of identity with the organization [34]. Thus, we hypothesize:

*H1: Perceived mutual engagement is positively related to perceived joint enterprise.*

Communities of practice rely on common resources such as words, tools, routines, stories, actions, or concepts, which Wenger [4] referred to as a shared repertoire. CoPs are also organized around a particular area of knowledge and activity that provides members with a sense of joint enterprise [4]. For a community of practice to sustain and reinforce a sense of joint enterprise, it needs to generate or appropriate a shared repertoire of resources such as tools, documents, routines, vocabulary, and symbols to carry and reserve the accumulated knowledge of the community. Thus:

*H2: Perceived shared repertoire is positively related to perceived joint enterprise.*

Similarly, the more frequently members mutually interact with each other on a common class of concerns and issues, the more likely they will be to collectively develop a common lexicon and protocol of local terms for communication, and adopt a pool of words, stories, and concepts that they will share among themselves, which represents a larger repertoire of shared resources. Thus, we hypothesize:

*H3: Perceived mutual engagement is positively related to perceived shared repertoire.*

### 3.2. Communities of Practice and Learning

The act of learning is commonly understood to be the acquisition and application of knowledge that enables an individual to address their tasks and issues for which solutions were not previously obvious [35]. Rather than viewing learning as the acquisition of

certain objects of knowledge, however, Lave and Wenger [16] emphasized that learning is situated within social relationships. It is not about acquiring subject matter, but rather about how to behave in a given group, and understanding what resources to use for what purposes [29]. Therefore, the learning process is tied to ongoing activities and practices and is carried forward by community members through mutual social interactions, rather than by isolated individuals [19]. Thus, we hypothesize:

*H4: Perceived mutual engagement is positively related to individual learning.*

Embracing a pool of shared repertoire may also facilitate interpersonal learning. On one hand, a shared repertoire (e.g., words, concepts, tools, documents) holds context-specific knowledge that is valuable to the members. On the other hand, a shared repertoire can provide common knowledge through shared meaning, and support knowledge transfer among members of the community [4, 36]. Thus, we hypothesize:

*H5: Perceived shared repertoire is positively related to individual learning.*

Joint enterprise influences individual learning through a sense of common identity. Community members’ sense of shared identity makes a CoP strong and encourages members to be more competitive in the workplace [30]. Identification defines the norms and conventions that individuals utilize to coordinate their behaviors, and creates opportunities for organizational learning [37]. Also, when a community of individuals is strongly bound by a common class of concerns and interests, their interactions will be more relevant and thus more likely to be perceived as valuable and helpful. Thus, we hypothesize:

*H6: Perceived joint enterprise is positively related to individual learning.*

### 3.3. Learning and Job Performance

We believe that the benefits of the CoP in terms of enhancing people’s capabilities and performance is best defined at the individual level, because knowledge as a resource is created within the individual [38] and uniquely embedded in the person [1]. Lave and Wenger [16] suggest that central to the notion of CoP as a means of knowledge acquisition is the process by which newcomers move from peripheral to full participation in the community as they learn from others [16]. As peripheral newcomers learn, they may gradually become full participants within the community of practice, and we expect that their performance will improve as well. Thus, we hypothesize:

*H7: Individual learning is positively related to individual job performance.*

## 4. Methodology

### 4.1 Sample and Data Collection

A field survey was used to empirically test the hypotheses. Data were collected from student subjects enrolled in the PhD program of a large Canadian business school. Several indicators led us to believe that these students were engaged in a genuine CoP. First, most members were physically co-located (the program occupied an entire floor of the business school building, where students had full access to their offices, a lounge, a kitchen, a computer lab, and several small-scale meeting rooms), and were able to frequently interact informally. This represents the characteristic of mutual engagement. Second, regardless of their discipline of study, most students in this program were required to take several common courses in their first two years (e.g., Management Theory, International Business, Research Methodology, and Statistics). These common courses provided the students with an opportunity to develop a common lexicon of research-related terminologies, concepts, and tools, which helped students to build up shared repertoire. Third, these students came together for the common purpose of preparing for their academic careers in management and business-related studies. In other words, they hold common identity and mutual accountability, i.e. joint enterprise, with those involved in the same program. Although they did not necessarily work together on joint research projects, they interacted and shared knowledge with one another, through a variety of formal means (e.g., research courses, seminars, colloquia), as well as informally and socially.

A Web-based survey was designed using Microsoft Office Front Page. A cover letter including the survey link was sent to 74 PhD students by email. Reminder emails were sent in the first and second week following the original invitation. A total of 53 completed questionnaires were returned, for a response rate of 71.6%.

### 4.2 Measures

We adopted a previously validated measure of job performance from the literature [39]. This included ratings of ability, judgment, accuracy, job knowledge, and creativity, measured on a seven-point Likert scale with anchor labels ranging from “unsatisfactory” to “excellent”. We chose this

measure because it addressed several key aspects of performance that we believe might be closely associated with learning.

Control variables thought to potentially influence individual learning included year in the program, gender, and age.

We developed new measures mutual engagement, shared repertoire, joint enterprise, and individual learning based on their definitions and in consultation with our research subjects. We then followed a standard two-stage conceptual validation exercise [40].

**Stage 1: Item Creation.** The objective of this first step was to ensure content validity by creating items based on constructs’ definitions. Eight items for each construct and five items for learning were initially devised. To situate the survey items in the context of the research site under investigation, we informally interviewed six students using open-ended questions (i.e., “please describe how you feel about your PhD community”, “how effective do you find the PhD community to be in improving your performance in the program?”). We used their responses to inform our situated item creation.

**Stage 2: Scale Development.** The goal at this stage was twofold: to identify ambiguous items, and to assess construct validity. Eight judges from a variety of functional areas were recruited to sort the items into construct categories through two rounds of card sorting exercises. Inter-judge agreement was used as the overall measure of reliability and validity [40]. Scales based on categories with a high degree of inter-judge agreement were deemed to possess a high degree of construct reliability and validity [40].

In the first round, four judges were asked to sort items and then provide their own labels for the emergent constructs [40]. The initial overall placement ratio was 76.7%, which is deemed a reasonable first-round score [40]. Nine items were identified as ambiguous (fitting in more than one category) or indeterminate (fitting in no category). After dropping these items, twenty items remained and the overall placement ratio increased to 87.5%. The placement ratio of each individual scale that had items dropped also increased (i.e., ME: from 71.9% to 85.0%; JE: from 59.4% to 70.0%; SR: from 87.5% to 100.0%).

The second round was carried out with the intention of cross checking the sorting results from the first round, using a different set of judges and a slightly different approach. The four new judges were given the items as well as the construct definitions, and asked to sort items into appropriate categories. Thus, items that were consistently categorized into the target construct had increased construct validity. Six additional ambiguous or indeterminate items

were removed using the same approach as in the first round, resulted in 14 final items (see Appendix I). The new scales demonstrated an overall placement ratio of 94.6%, and individual scale placement ratios of at least 90%, comparable to the final scores obtained by Moore and Benbasat [40]. Thus, it was concluded that these scales demonstrated adequate reliability and construct validity.

### 4.3 Analysis Technique

The Partial Least Squares (PLS) technique was used to test the research model [41]. PLS is a second generation structural equation modeling technique that enables “path analytic modeling with latent variables” [42]. This technique is regarded as an appropriate statistical tool for early stage research models where the emphasis is on theory exploration, extension, and prediction [43]. Unlike standard linear regression, PLS does not require multivariate normality when estimating parameters, and is suitable for use with smaller samples, as was the case in our study [44]. The loadings of items on constructs in a PLS model are the same as factor loadings, and the path coefficients are standardized regression coefficients. Tests of reliability and validity were conducted [45], as described below.

## 5. Measurement Model

Results demonstrated satisfactory item reliability, internal consistency, convergent validity, and discriminant validity (Table 2). All items loaded above 0.70 on their respective constructs (with one exception: one item of ME load at 0.65), indicating acceptable item reliability for an exploratory study (Table 3) [42]. Second, internal consistency scores for the seven constructs in the research model were all above 0.8, exceeding the commonly used 0.7 cutoff [46]. Third, the average variance extracted (AVE) was above the 0.5 threshold for all constructs [42], suggesting satisfactory convergent validity. Fourth, items correlated most strongly with their intended construct, indicating acceptable discriminant validity (Table 3) [44]. The average correlation among the measures of each construct was greater than that construct’s relationship with any other construct, providing further evidence of discriminant validity.

In addition, we performed a statistical analysis to assess common method bias issues following the works of Podsakoff et al. [47] and Liang et al. [48]. We included in the PLS model a common method factor whose indicators were all the principal constructs’ indicators, and calculated each indicator’s variances substantively explained by the principal construct and by the method. The results

demonstrated that the average substantively explained variance of the indicators was 0.78, while the average method-based variance was 0.01. The ratio of substantive variance to method variance was about 78:1. In addition, most of method factor loadings (16 out of 18) were not significant. Given the small magnitude and insignificance of method variance, we conclude that method is unlikely to be a serious concern for this study.

Table 2. Means, standard deviations, and inter-correlations for constructs (N=53)

	#items	mean	S.D.	ME	JE	SR	IL	P	Year	Age	Gender
ME	3	4.42	1.19	<b>0.81<sup>a</sup></b>							
JE	3	4.81	1.28	0.67	<b>0.81</b>						
SR	3	4.25	1.40	0.27	0.43	<b>0.83</b>					
Learning	5	4.38	1.68	0.73	0.67	0.39	<b>0.90</b>				
Performance	4	5.25	0.93	-0.09	0.16	0.07	-0.18	<b>0.87</b>			
Year	1	2.32	1.09	0.03	0.18	0.23	-0.20	0.20	<b>1.00</b>		
Age	1	2.38	0.60	-0.03	0.04	0.13	-0.01	-0.12	0.23	<b>1.00</b>	
Gender	1	0.34	0.48	-0.07	-0.12	-0.09	-0.29	0.20	0.08	-0.19	<b>1.00</b>

<sup>a</sup> Bold-faced elements on the diagonal represent the square root of the average variance extracted. Off-diagonal elements are correlations between measures. For adequate discriminant validity, the elements in each row and column should be smaller than the bold-faced element in that row or column.

Table 3. Factor and cross-factor loadings, internal consistency reliabilities, and average variance extracted from measures

Measure	Loading							Year	Age	Gender
	Joint Enterprise (0.86, 0.66)	Mutual Engagement (0.85, 0.66)	Shared Repertoire (0.87, 0.69)	Learning (0.95, 0.81)	Performance (0.93, 0.76)					
JE1	0.83	0.50	0.39	0.63	0.10	0.19	0.11	-0.16		
JE2	0.75	0.45	0.26	0.45	0.11	-0.01	-0.05	0.06		
JE3	0.86	0.66	0.38	0.55	0.17	0.22	0.03	-0.14		
ME1	0.68	0.93	0.27	0.81	-0.15	-0.04	0.04	-0.14		
ME2	0.54	0.83	0.02	0.50	0.13	0.11	-0.04	0.06		
ME3	0.32	0.65	0.39	0.38	-0.18	0.05	0.07	-0.04		
SR1	0.37	0.24	0.85	0.24	-0.01	0.23	0.19	0.01		
SR2	0.36	0.15	0.80	0.32	0.15	0.23	0.18	-0.05		
SR3	0.35	0.27	0.83	0.40	0.05	0.14	-0.01	-0.17		
IL1	0.62	0.65	0.35	0.89	-0.07	-0.14	-0.07	-0.23		
IL2	0.85	0.70	0.35	0.92	-0.20	-0.18	-0.05	-0.23		
IL3	0.63	0.69	0.31	0.93	-0.23	-0.29	0.00	-0.27		
IL4	0.54	0.56	0.34	0.88	-0.18	-0.23	0.07	-0.29		
IL5	0.59	0.68	0.42	0.88	-0.10	-0.05	0.04	-0.30		
PF1	0.32	0.04	0.04	-0.09	0.85	0.09	-0.25	0.13		
PF2	0.08	-0.09	0.07	-0.21	0.93	0.15	-0.20	0.21		
PF3	0.12	-0.15	0.11	-0.14	0.87	0.11	0.03	0.15		
PF4	0.14	-0.06	0.03	-0.13	0.83	0.33	-0.01	0.16		
Year	0.18	0.03	0.23	-0.20	0.20	1.00	0.23	0.08		
Age	0.04	0.03	0.13	0.00	-0.12	0.23	1.00	-0.19		
Gender	-0.12	-0.07	-0.09	-0.29	0.20	0.08	-0.19	1.00		

\* Values in parentheses represent internal consistency reliability, and average variance extracted, respectively, for each factor.

## 6. Structural Model

The path coefficients and explained variances for the model are shown in Figure 2. The results show that the three CoP factors together explain 75% of the variance in individual learning, and mutual engagement and shared repertoire explain 51% of the variance of joint enterprise. Results provide support for six out of seven hypotheses proposed. Hypothesis



1, which states that perceived mutual engagement is positively related to perceived joint enterprise, was supported ( $\beta=0.59$ ,  $t=8.02$ ,  $p<0.001$ ). Hypothesis 2, which states that perceived shared repertoire is positively related to perceived joint enterprise, was supported ( $\beta=0.27$ ,  $t=2.93$ ,  $p<0.01$ ). Hypothesis 3, which states that perceived mutual engagement is positively related to perceived shared repertoire, was partially supported ( $\beta=0.27$ ,  $t=1.83$ ,  $p<0.1$ ). Hypothesis 4, which states that perceived mutual engagement is positively related to individual learning, was also supported ( $\beta=0.48$ ,  $t=3.80$ ,  $p<0.001$ ). Hypothesis 5, which states that perceived shared repertoire is positively related to individual learning, was partially supported ( $\beta=0.19$ ,  $t=1.84$ ,  $p<0.1$ ). Hypothesis 6, which states that perceived joint enterprise is positively related to individual learning, was supported ( $\beta=0.30$ ,  $t=2.60$ ,  $p<0.01$ ). However, Hypothesis 7, which states that individual learning is positively related to job performance, was not supported ( $\beta=-0.18$ ,  $t=1.24$ , n.s.).

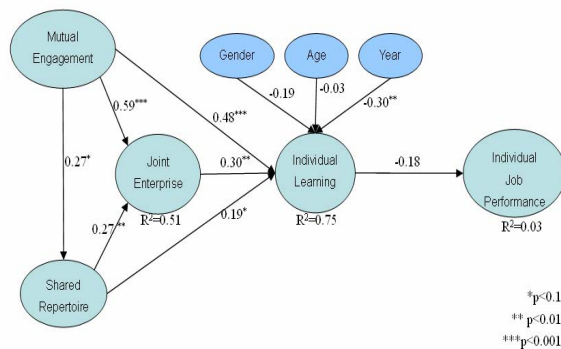


Figure 2. PLS Results

Among the three control variables, only year in program was significant ( $\beta=-0.30$ ,  $t=3.47$ ,  $p<0.01$ ) – i.e., the longer one stayed in the community, the less he or she perceived themselves learning from the community.

## 7. Discussion

Our results show that the three core CoP characteristics are strongly interrelated. The existing CoP literature implies this interrelationship [4], but to the best of our knowledge no empirical studies have verified it.

These results also show that each of the three CoP characteristics affects individual learning in both direct and indirect ways, confirming the hypothesis that the degree to which individuals perceive their engagement in a work-related community of practice positively predicts their learning outcome.

Surprisingly, results suggest we should reject the previous assumption that learning through CoPs impacts job performance. There might be two alternative explanations for this surprising finding. First, CoPs may directly affect job performance, rather than through learning. Previous literature has suggested that frequent communication and joint problem solving could improve one’s performance. Likewise, a stronger sense of identification with a community may motivate an individual to align his own interest with the collective’ interest, thus leading to higher performance. Furthermore, the more helpful shared resources/repertoire are to one’s job, the more likely they are to perform better regardless of learning. Thus, we did a post-hoc analysis to check the direct relationships between CoP characteristics and performance. Results showed that joint enterprise had a significant, positive influence on individual performance ( $\beta=0.44$ ,  $t=3.14$ ,  $p<0.001$ ), mutual engagement had a significant, but negative effect on performance ( $\beta=-0.41$ ,  $t=2.33$ ,  $p<0.01$ ), and shared repertoire had no significant relationship with performance ( $\beta=0.01$ ,  $t=0.16$ , n.s.). The post-hoc analysis further revealed that performance might be enhanced only by joint enterprise, but not directly by mutual engagement or shared repertoire.

Another plausible explanation may be that the effect of learning on performance may depend on individual experience in the community. In other words, the ability to convert what is learned into actual performance might be different between experienced and inexperienced community members. To explore this further, we reasoned that experience with community might be influencing the results. We conducted a post-hoc analysis by including years in the community as a moderator of learning on performance. Results (plotted in Figure 3) showed that years in the community positively moderated the relationship between learning and performance ( $\beta=0.34$ ,  $t=4.17$ ,  $p<0.001$ ), such that the relationship of learning and performance is substantially stronger for experienced members than inexperienced members. For experienced individuals, higher performance is associated with higher learning, supporting our reasoning that experienced individuals perform better when they learn more from the community. By contrast, more learning in the community leads to slightly lower performance for junior members. This might be because new participants benefit more in terms of competence building rather than actual performance. By focusing on learning, junior members may experience lower performance in the short-term.

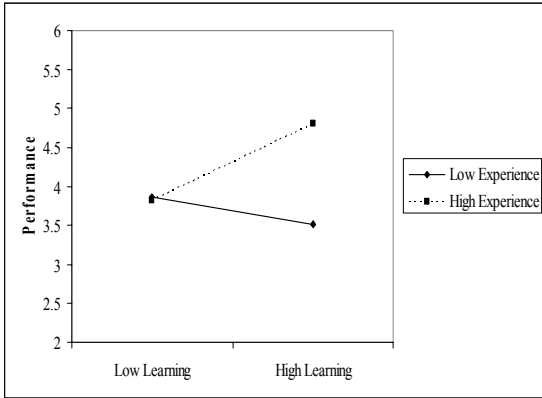


Figure 3. The interaction effect

This finding has important implications. Conventional wisdom assumes that experienced community members benefit less through interpersonal interactions within the community because they already possess more knowledge and experience than others. Our findings suggest that experienced members can still benefit from their community. Through interaction with newcomers, experienced members' reflections on their own actions can be elicited [30]. Once they do learn from the community, their learning has a direct and positive impact on their performance. On the other hand inexperienced members may learn more from CoPs than experienced members, but their learning may not have a strong influence on their performance until they become more experienced and build up a certain level of competence.

## 8. Conclusions, Implications, and Future Research

This study makes several important contributions to the community of practice literature. It is among the first to operationalize the three key characteristics of communities of practice (i.e., mutual engagement, joint enterprise, and shared repertoire). The scale development process used in this study closely follow that of Moore and Benbasat [40] resulting in new scales that demonstrate strong measurement properties. The research model was tested and validated using data collected from a field survey. The research model and the measures can be used as references in future research that will quantitatively investigate communities of practice.

Second, we have confirmed that the three core characteristics as suggested by Wenger [4] are highly interrelated. Wenger suggested that the three key characteristics may be mutually influential, which leads to the gradual development of communities of practice [4]. However, empirical research examining

these interrelationships is limited. Our study fills in this blank.

Third, we have verified that communities of practice do have positive effects on individual learning, and provide statistical evidence to the propositions drawn from social observation using qualitative studies [e.g., 4, 16, 49].

Finally, this paper unveils a complex relationship between learning from communities and individual job performance. While the existing literature assumes that learning result in superior job performance [e.g., 49], these findings suggest that the relationship is moderated by members' experience in the community. While inexperienced individuals learn more than experienced individuals, learning has immediate positive performance implications only for experienced individuals. Thus, we have added more insights into the relationship between learning and performance.

The implications of our study for practicing managers are clear. First, managers should continue to cultivate communities of practice and encourage both experienced and inexperienced members to be involved. Practicing managers should not expect immediate performance improvement from junior members. Instead, they should allow junior members to take their time and accumulate knowledge. On the other hand, although experienced members may feel that they will learn less from the community, practicing managers should encourage them to be involved in the community as well. Once experienced members learn, their performance can be improved immediately.

In order to develop a community of practice, mutual engagement through interpersonal interactions around a common set of concerns and interests should be encouraged, because such behavior contributes to the development of a pool of shared repertoire and a common sense of identity. These elements can collectively influence individuals' learning from the community.

This paper also identifies several opportunities for future research in the area of knowledge management. First, we derived our findings from a relatively small sample size. Future research could test the model and refine the measurement scale using a large sample size for extended generalizability and item reliability. Although a small sample size may reduce statistic power, it could become an issue only when the study fails to reject a null hypothesis, which in fact should be rejected [50-52]. However, statistical power may not be a notable concern since most hypothesized relationships are significant. Second, the moderating effect of members' experience on the relationship between learning and job performance needs to be further



investigated. Likewise, testing of the direct relationships between COP characteristics and performance is tentative and post-hoc in the current study. Future research should focus on developing a more complete theoretical understanding of the relationships between COP and individual performance. It is possible that additional hidden factors will provide further explanations for the non-significant results between learning and job performance. Third, we tested our model using self-reported performance measures. While the potential for common method bias has been eliminated using the procedure suggested by Podsakoff et al. [47] and Liang et al. [48], future research could leverage the objective individual job performance or performance ratings given by others (e.g., by managers). Fourth, the survey we conducted was cross-sectional. While we developed our hypotheses by drawing on the existing theory, empirical testing of causal relationships could be enhanced using a longitudinal study, a potential area for improvement in future research.

To sum up, this research study builds on the CoP literature and empirically investigates the interrelationships among communities of practice, individual learning, and job performance. The results show that the core characteristics of communities of practice are interrelated and influence individual learning. We also show that individual learning from communities of practice has a different impact on job performance depending on level of experience in the organization, such that experienced members can more effectively turn learning into an immediate performance improvement.

**Appendix I:**

Construct	Items
Joint Enterprise	I feel a positive sense of achievement when this community thrives
	I have a strong sense of belonging to this community
	When I am with members of this community, I feel I am "at home"
Mutual Engagement	We have frequent personal interaction
	People in this community frequently interact with one another to solve common problems
	I frequently interact with members of this community to do my job
Shared Repertoire	Members of this community share a common vocabulary
	Individuals in this community know each other's "mental models"
	I quickly understand what community members are trying to say without too much explanation by them
Learning	If I did not have this community, I would be much less effective in my job
	The things I learn from this community frequently impact my job activities
	This community provides an important source of my overall learning
	I am constantly learning new things from this community
	The things I learn from members of this community stick with me for a long time
Job Performance Evaluations	My ability to performance core job tasks
	My judgment when performing core job tasks
	My accuracy when performing core job tasks
	My creativity when performing job tasks

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