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The Role of Students' Professional Experience in Online Learning: Analysis of Asynchronous Participation

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Abstract

This paper reports on a causal-comparative study that investigated potential differences in students' participation in asynchronous online learning environments according to their professional experience. In the study, 893 messages from 77 students in an online master's program in human resource development (HRD) at a large U.S. university were analyzed. The research shed light on an important component of online education by illuminating ways in which novices and experienced students tend to relate to each other, the instructor, and the content of specific topics. Findings show evidence of both novices and experienced students using this medium in a very similar way when dealing with asynchronous tools. Discussion and recommendations are presented.

Keywords: experts, novices, distance education, asynchronous discussion board, online graduate program

Introduction, Purpose, and Goals

In many professional master's degree programs, students' experience levels vary greatly. Some students are novices who are exploring the field for the first time, while others are experts with years of experience who are seeking professional development or formal credentials. The vast literature about novices and experts influenced this inquiry into examining students with differing levels of assumed competencies in a field of practice. In addition to competencies, experts have more domain knowledge (Johnson, 1988) and perform better organization of their domain knowledge (Joseph & Patel, 1990) than novices. In fact, one of the common assumptions about experts is that they know all the answers to relevant questions. Most

of the literature about novice–expert issues focuses on investigating the differences between novices and experts in the context of problem-solving activities in non-virtual environments (e.g., Adams, Kaczmarczyk, Picton, & Demian, 2009; Ball, Ormerod, & Morley, 2004; Dufresne, Gerace, & Leonard, 1997; Sweller, 1988). The research about novice–expert issues in online learning environments is very limited. Research about differences in communication patterns between novices and experts in online courses is especially limited.

The aims of this study were: (1) to investigate how novices and experienced human resource development (HRD) professionals in an online master's program differed in their participation in an asynchronous communication environment; and (2) to explore the link between such participation and quality of learning experience. The length of each student's professional experience in the HRD field determined each individual's classification as a novice or experienced professional.

Literature Review

Bransford, Brown, and Cocking (1999) offer six key principles or attributes of experts' knowledge and their potential implications for learning and instruction: (1) meaningful patterns of information; (2) an extensive amount of organized content knowledge; (3) contextual knowledge; (4) flexibility in retrieving important knowledge; (5) no guarantee of being a good teacher; and (6) adaptive expertise. These six principles emerged from a synthesis of research findings across a range of disciplines and subjects (e.g., mathematics, electronics, computer programming, chess). Although not directly addressed in this study, they serve as indicators to the main construct under scrutiny here, specially dealing with chunks of knowledge and frequency required to build new knowledge under the conditions explored in the study.

A large number of studies have found that experts develop sensitivity to patterns of organizing information (de Groot, 1965; Egan & Schwartz, 1979; Ehrlich & Soloway, 1984; Hinsley, Hayes, & Simon, 1977; Johnson, 1988; Lesgold, 1988; Miller, 1956). Experts are able to chunk information into familiar and meaningful patterns. Studies conducted by Chi, Feltovich, and Glaser (1981), Leonard, Dufresne, and Mestre (1996), Paige and Simon (1966), Popovic (2004), and Wineburg (1991, 1998) found that experts organize their knowledge around core concepts that guide their thinking about their domain. Experts do not simply treat their knowledge as a list of facts and formulas, but instead use them in a more holistic manner and apply major principles in an attempt to solve problems. Novices, on the other hand, generally utilize a direct strategy by looking at the problems' surface attributes and attempt to solve the problem by applying generalized rules or formulas. Experts are also able to retrieve their knowledge more fluently or automatically (LaBerge & Samuels, 1974; Schneider & Shiffrin, 1977). Swain and Mills (2003) suggested that experts apply more implicit communication strategies than novices while working together in a team. These research findings indicate the superiority in experts acquiring and processing knowledge; however, very little research has been conducted to investigate differences between these two groups in communicating their knowledge to each other. This communication is crucial for the progression of knowledge development, given the heterogeneity of experience levels in many work and school contexts.

In online education research, there have been multiple calls for more research investigating the complexities of interpersonal interaction and online communication (Githens, 2007; Picciano, 2002; Sutton, 2001; Swan & Shea, 2005). Specifically, some studies have focused on the motivational aspect in asynchronous online discussion. For example, Xie, Durrington, and Yen (2011) reported stronger relationships between motivational components such as perceived value and competence and their participation while engaged in online discussion as classes progressed over time. Moreover, although previous studies have discussed the content analysis or participation pattern in asynchronous online discussion (e.g., Adeyinka & Abdulmumin, 2011; Hara, Bonk, & Angeli, 2000; Tella & Isah, 2011; Wolff & Dosdall, 2010), few studies have addressed issues from the expert–novice perspective.

Given the differences between novices and experts, this study inquires into whether these cognitive differences manifest themselves in the contribution levels in an asynchronous discussion board in multiple sections of the same fully online course. The main problem driving this study is related to the issue of substantial differences between experts and novices in cognitive approaches to problems, leading to the need to comprehend whether these differences affect participation levels in asynchronous learning environments.

Research Question and Hypotheses

The main research question guiding this study focuses on quality of learning experience and the use of an asynchronous online learning environment and its resources by two distinct groups of learners,

categorized according to professional experience level: novices and experienced professionals. The research question was:

> *How can quality of learning experience be related to active use of an asynchronous online learning environment by students with varying levels of professional experience?*

By "active use" we refer to the posting of more and lengthier messages and the creation of new threads in the asynchronous online learning environment adopted by the selected course (i.e., discussion board).

In addition, four hypotheses were constructed and tested in this quantitative study to investigate how novices and experienced professionals differ in their objective interaction via text-based postings in an asynchronous online learning environment. Novices were classified as those having two or fewer years of experience in the HRD field at the start of the course. The four hypotheses established in this study were as follows:

- H_1: When compared to experienced professionals, novices write and post significantly lengthier text messages to the asynchronous environment.

- H_2: When compared to experienced professionals, novices create significantly less threads in the asynchronous environment.

- H_3: When compared to experienced professionals, novices write and post significantly more individual messages (total postings) to the asynchronous environment.

- H_4: When compared to experienced professionals, novices report a higher quality of learning experience (as observed in their reflection papers).

Research Method

A quantitative study employing basic descriptive statistics, t-tests, and non-parametric binomial directional (one-tail) tests with a .05 alpha level was conducted to test the abovementioned hypotheses. The causal-comparative research design was adopted due to the ex post and non-manipulative approach of the study and its exploratory nature (Gall, Gall, & Borg, 2003). The dataset explored in this study is based on three offerings of a course titled *Introduction to HRD* during two academic semesters at a large U.S. Midwestern university. This was the first course in a nine-course sequence of a 100% online cohort-based master's program in HRD at the university.

From the entire set of messages present in the course discussion board, only messages located in the "Topic of the Week" discussions were analyzed. In these forums, the instructor posed a specific topic and/or question to start the discussion, and participants were encouraged to reflect on the questions, review their peers' responses, and pose further questions for discussion.

Beyond stressing the rules of engagement (e.g., syllabus), the instructor was active during: (1) synchronous sessions, to remind participants of the relevance of peer collaboration for learning, especially through planned asynchronous participation; and (2) asynchronous portions, by monitoring participation (posts) and providing prompt feedback on the discussions (often acting as a relevant and rich complement to the synchronous part of the curriculum). Asynchronous participation counted for 20% of each student's final grade. However, there were no specific numeric requirements for participation. This instructional design was crucial for this study, as participation was truly based on a natural and voluntary interaction, potentially affected by the background and confidence level of the participant with regard to each specific theme. Thus, the final grade was assessed based on an asynchronous discussion reflection paper in which students were asked to write a coherent, thoughtful reflection about their asynchronous discussion experience in the course, including specific examples of what they learned from others. In an appendix to that paper, they were required to provide a quantitative summary of the messages posted during each week of the semester. These "Topic of the Week" discussions were purposely selected since those messages tended to be more profound and structured than those in the other forums in the course. Each course offering had between 6 and 11 "Topic of the Week" discussion forums during the academic semester.

A limitation of the study is linked to possible extrinsic motivation of class participation potentially affecting the final grade (a 20% effect), although a particular threshold for postings was not set (i.e., no minimum number of posts was imposed on the students). Another potential limitation is that students tend to learn from one another, which may affect their posting behavior and the patterns of their posts.

Data Analysis and Findings

The students in the three course offerings posted a total of 893 messages to the relevant forums. A total of 77 users (students) were involved in this study, of whom 44 were classified as novices and 33 were classified as experienced professionals (based on the professional-experience threshold of two years, as explained earlier). Table 1 shows the breakdown of messages and users for each course offering.

Table 1. *Forums, messages, and users (students)*

| Course Offering	Forums	Messages			Users		
		Total	Novices	Experienced	Total	Novices	Experienced
SP06/1	11	589	370	219	37	24	13
SP07/1	7	189	67	122	22	9	13
SP07/2	6	115	69	46	18	11	7
Total	24	893	506	387	77	44	33

The following are three examples of messages posted in response to specific critical-thinking questions posed by the instructor:

> "Since I too have no experience in HR/HRD, I can base my feelings on experiences I have had in different offices. At times I feel that the competitiveness is really a sign of individuals feeling threatened. They are concerned that someone will get ahead of them in the corporate race for promotions, etc. Some individuals will never understand that when one wins we all win" (novice, on corporate rivalry)

> "I think the training should fit the situation. That is where HRD should step in and access the need to match the training with the appropriate requirement. There is not a "one-stop shop" for all training needs in an organization" (novice, on training needs)

> "I think this issue is singularly important to HRD because it is a battle with the greed and selfishness inherent in our sinful nature" (more experienced participant, on ethics)

A simple frequency analysis of the posting activities shows single users posting from 1 to 56 messages in the course. Individual students from the group of novices posted from 1 to 28 messages, while the group of experienced students posted from 1 to 56 messages (per student). It is noteworthy that the average number of messages per user and per forum in each course offering (respectively, SP06/1, SP07/1, and SP07/2) has an interesting declining pattern, when observing both novices (1.40, 1.06, and 1.05) and experienced professionals (1.53, 1.34, and 1.10). Figure 1 contains a boxplot of the messages, stressing a slightly higher average for the group of experienced professionals. In this graph, each box represents the quartiles of each group (from the lower to the upper quartile, with the lines within the boxes representing the medians).
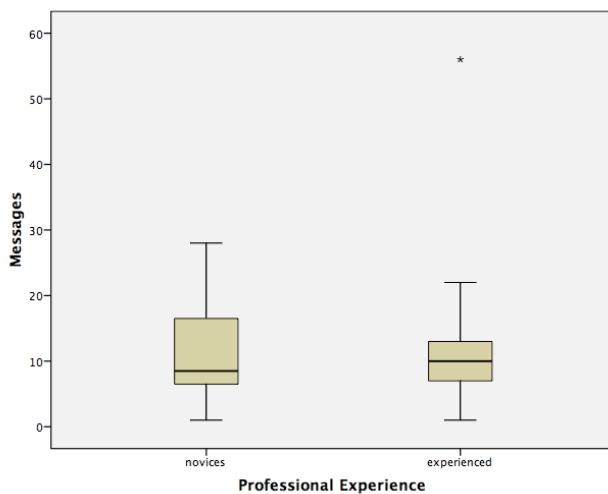
* Outliers

Figure 1. *Boxplot of posting activities: Messages*

In order to analyze the dataset aiming at aspects of online education and the use of an asynchronous environment, a comparative analysis between novices and experienced professionals in HRD was developed, considering all message boards (from the various offerings of the course) together. The focus was on the messages' attributes (i.e., length, quantity, threads), with the message being considered the fundamental unit of analysis. Due to the fact that tests of normality (Kolmogorov-Smirnov) did not indicate a sound approximation of the distribution of these data to the normal distribution, we also computed non-parametric procedures when analyzing the data.

First, a frequency analysis of the posting activities of single users showed students posting from 1 to 56 messages in the course. The group of novices posted from 1 to 28 (n = 44, Md = 8.50, M = 11.50, SD = 7.01) messages, and the group of experienced students posted from 1 to 56 (n = 33, Md = 10.00, M = 11.73, SD = 9.55) messages per student. Table 2 contains descriptive statistics of the variable message for both groups.

Table 2. *Descriptive statistics: Number of messages*

	Min.	Max.	Mean	Std. Dev.	*SD/M*
Novices	1	28	11.50	7.01	0.61
Experienced	1	56	11.73	9.55	0.81

Besides the visual evidence, with regard to the frequency of posting, no significant differences between novices and experienced professionals were found, based on the Mann-Whitney non-parametric test (U = 717.50, Z = -0.088, p = .930), at the .05 alpha level.

As can also be seen in Table 2, the dispersion (based on the standard deviation) in the number of messages posted is higher for the group of experienced professionals. The coefficient of variation (SD/M) indicates a higher proportional dispersion for the experienced professionals – 81%, compared to 61% for the novices.

Table 3 contains descriptive statistics of the variable message length for both groups. In this case, the coefficient of variation (SD/M) indicates an inversion of proportional dispersion in both groups, although offering somewhat similar levels – 72% for the novices and 68% for the experienced professionals (see Figure 2).

Table 3. *Descriptive statistics: Message length (number of characters)*

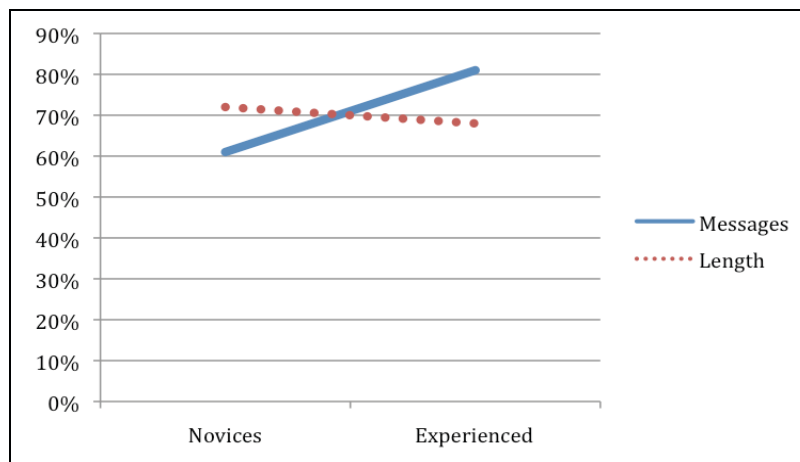|	Min.	Max.	Mean	Std. Dev.	*SD/M*
Novices	95	8,841	1,110.19	795.75	0.72
Experienced	100	5,707	1,202.99	812.07	0.68

Figure 2. *Comparison of the coefficient of variation (*SD/M*) of number of messages and length of messages across novices and experienced subjects*

Addressing the first hypothesis (that novices write and post lengthier messages), it was observed that the novices posted messages ranging from 95 to 8,841 characters each (n = 506, M = 1,110.19, SD =

795.75), while the experienced professionals posted messages ranging from 100 to 5,707 characters each (n = 387, *M* = 1,202.99, *SD* = 812.07). Although the maximum message length was greater in the group of novices (8,841 characters compared to 5,707 characters), due to outliers, the overall variance of the length of messages posted by experienced professionals was slightly higher. Figure 3 contains a boxplot of message lengths, showing a visual similarity of averages and dispersions for both groups.
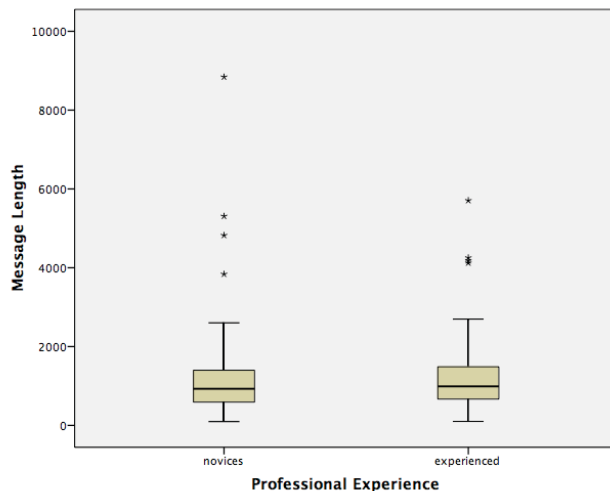
* Outliers

Figure 3. *Boxplot of posting activities: Message length*

Comparison of message length means between the groups using a t-test (*t*(891) = -1.712, *p* = .087) showed that no statistically significant differences exist. However, after running a Mann-Whitney non-parametric test with data from novices and experienced professionals (*U* = 90350.00, *Z* = -1.980, *p* = .048), the null hypothesis was rejected at the .05 alpha level. It is clear that students who are novices do not write and post significantly lengthier text messages to the asynchronous environment, when compared to those who have more experience as professionals in the field.

The number of threads (new discussion topics) created by students was examined in order to address the second hypothesis of this study (that novices create significantly fewer number of threads). It was found that the novices created 25 new threads, while the students with more professional experience created 21 new threads. A non-parametric binomial test was carried out with a hypothetical proportion of .571 (44/77), based on the proportion of novices present in the sample. The test results showed that, with these data, the observed proportion (25/46 or .543) does not differ significantly from the hypothesized value (*p* = .407). Thus, the null hypothesis associated with the second hypothesis of this study was not rejected at the .05 alpha level. In other words, the results do not show that novices create significantly fewer threads (new discussion topics) in the asynchronous online learning environment than their more experienced counterparts.

The total number of messages posted by students was also studied in order to address the third hypothesis of this paper (that novices write and post significantly more individual messages). As mentioned earlier, the novices posted 506 messages, while the experienced students created 387. Again, a non-parametric binomial test was used with a hypothetical proportion of .571 (44/77), based on the proportion of novices in the sample. The test results showed that the observed proportion (506/893 or .567) does not differ significantly from the hypothesized value (*p* = .408). The null hypothesis associated with the third hypothesis of this study was therefore not rejected at the .05 alpha level. This means there is no significant difference between novices and experienced professionals in terms of the number of text messages posted to the asynchronous online learning environment.

Discussion

Considering the results of study in light of the supporting literature, the absence of statistically significant differences between novices and experienced professionals in presenting their thoughts and ideas through asynchronous online media may be due to at least two factors. First, the use of implicit communication strategies that is found with experts (Swain & Mills, 2003) may be manifested in the way

that these experienced professionals convey their ideas to the class. In other words, as these experienced professionals become accustomed to utilizing shared mental models among themselves in conveying their thoughts and ideas, they may use an indistinguishable asynchronous communication strategy when compared to novices.

Second, the interaction between the two groups of students may have made the distinction between them less apparent. Both the novices and experienced professionals were posting their thoughts and ideas on an asynchronous online medium as components of the course assignments. Isaacs and Clark (1987) suggest that experts and novices are able to assess one another's level of expertise almost immediately, and can adjust key elements of their communication patterns accordingly to communicate more efficiently with one another. As the students in the two groups were exchanging thoughts and ideas asynchronously online, their strategies in communicating with one another may have become indistinguishable.

Conclusion

By focusing on communication in the asynchronous environment, this study attempted to shed light on an important component of online education while investigating specific ways in which novices and experienced professionals tend to relate to one another, the instructor, and the content of specific topics. The literature on cognitive and behavioral dimensions focusing on novices and experts is rich in identifying distinct organizing models and patterns for dealing with information, which are critical in learning situations. This literature also appears to emphasize that more efficient communication elements and structure are adopted by experts when working in teams. As suggested by previous studies, interaction among participants in online education environments represents a highly relevant aspect of adult learning (Githens, 2007; Picciano, 2002; Sutton, 2001; Swan & Shea, 2005). In this study, we sought to integrate and build upon these two bodies of literature.

The results of the study show that when dealing with asynchronous communication tools in an online course, students (either novices or experienced professionals) tend to use the medium in very similar ways. For those assumed to have upfront deficiencies (i.e., novices) or upfront advantages (i.e., experienced professionals), there were no significant differences in their discussion contribution levels, based on quantitative asynchronous participation metrics. This finding stands in contrast to Githens' (2007) qualitative study of an online professional development course, in which inexperienced participants read discussion forums but did not actively participate in making online postings. Perhaps, due in part to the design of the master's program used as a setting in this study, the cohort arrangement and team activities allowed for novices to feel more comfortable and confident in making posts. Additionally, Poole's (2000) study found an interesting association, indicating that students who made few asynchronous postings were quite active in reading others' postings, which can be used to improve instructional strategies.

These findings also suggest that mixing experienced professionals and novices does not necessarily hinder participation in online asynchronous discussions. Although the literature indicates that experts and novices utilize differing cognitive approaches in addressing problems and issues, the results of this study mildly suggest that both groups seem equally comfortable in contributing to asynchronous conversations.

Recommendations

The finding from this study that novices and experienced professionals display similar frequencies in their postings to the asynchronous environment may be used to help inform the development of strategies to support the online teaching and learning process. Future research could explore and evaluate specific asynchronous strategies that may benefit from situations in which novices and experienced professionals post at similar frequency levels. Examples of such strategies are: (1) integrative asynchronous activities that combine novices and experienced professionals into smaller groups; (2) threaded group discussions started by guest professionals with contributions from novices and experienced professionals; and (3) student-initiated structured threads with pre-determined leaders and responders.

Given the relationships that may exist between reading activities and posting behaviors in asynchronous environments (Poole, 2000), further research could examine both postings and number of messages read when comparing novices to experienced professionals. Qualitative studies could be conducted to investigate whether experts adopt de facto mentor roles in which they assist their novice classmates in better understanding the professional field and the knowledge surrounding the field.

Two final recommendations are offered for future research. First, since this study found no significant quantitative differences in participation levels between novices and experienced professionals, the focus of future studies may need to take into account the content of the messages. Looking at Freebody's (2003) social interaction characteristics such as turn-taking; building of exchanges, alliances, and institutional categories; and questions of identity in posted messages may lead researchers to more interesting findings regarding differences between these two groups of professionals. Conversational analysis methods may be considered for the purpose of such studies. The second recommendation is a cautionary one derived from the first recommendation: as conversations develop according to the context (Garfinkel, 1967), an analysis should be performed on a specific topic of discussion. In other words, qualitatively analyzing conversations in a multiple-topic discussion may not only be difficult, but may also carry potential data validity issues.

This study contributes to research and practice by helping us better comprehend the role of students' professional experience in asynchronous discussions as part of online professional master's programs. It is hoped that subsequent research and practical experimentation will further build on this understanding and lead to better integration of novices and experienced professionals in asynchronous online discussions, so that both groups may derive maximum benefit from their participation in those discussions.

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