

## **Validation of Davenport's classification structure of knowledge-intensive processes**

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# Validation of Davenport's Classification Structure of Knowledge-intensive Processes

## Structured Abstract

**Purpose:** This study tests the validity of a knowledge work typology proposed by Davenport. Although this typology has been referenced extensively in the literature, it does not appear to have been empirically validated.

**Methodology:** The typology was tested through a questionnaire survey amongst knowledge workers (n=459) in a multinational company. A Principal Component Analysis (PCA) was applied to determine the knowledge work groupings arising from the survey.

**Findings:** The vast majority of the respondents could not be grouped into any one of Davenport's four knowledge work types. Furthermore, PCA revealed four groupings: Low-agency Collaboration; Low-agency Routine Work; Rule-based Work; and High-agency Expert Work. Our results confirm only one of Davenports' typology models, the Expert model. Davenport's Collaboration model was found to have elements of the Transaction model. The Transaction and the Integration typology models were not confirmed. Instead, two further models incorporating elements of both Transaction and Integration models emerged. Finally, in contrast to Davenport's typology, the clusters that emerged from our study do not fit a matrix structure.

**Research limitations:** A follow-up qualitative study would be required to better understand the four models that emerged from our data and to elucidate organisational factors that underpin the models.

**Originality:** This is the first empirical study testing the validity of Davenport's typology.

## Keywords:

Knowledge work, knowledge workers, knowledge work typology, knowledge management

## Paper type:

Research paper

## Introduction

The concepts of knowledge work and knowledge workers have in the past decades become prominent in the specialist literature and societal discourse alike. Consequently, the issue of knowledge worker productivity – and how to manage, improve and measure it - has become central to management literature (Davenport, Thomas and Cantrell, 2002; Drucker, 1999).

Despite the popularity, notions of knowledge work and knowledge workers lack conceptual clarity and empirical grounding. Furthermore, the breadth and diversity of tasks, processes and functions involved in knowledge work suggests that knowledge workers may not be a uniform group. However, because of the increasing importance of knowledge workers in the current “knowledge economy”, and particularly to innovation and growth within organisations, improved understanding of how knowledge work can be supported could be useful to organisations. The following statement is evocative of the general sentiment about the importance of knowledge workers: “*Knowledge workers are responsible for sparking innovation and growth in your organization. They invent your new products and services, design your marketing programs, and create your strategies. In the current economy, they are the horses that pull the plow of economic progress. If your companies are going to be more profitable, if our strategies are going to be successful, if our society is going to become more advanced - it will be because knowledge workers did their work in a more productive and effective manner*” (Davenport, 2005, pp. 3-4).

Management literature suggested that in order to support knowledge work adequately, organisations must better understand the nature of what knowledge workers do. Classifying knowledge work according to shared characteristics has been one way of doing so, and a range of different ways of knowledge worker differentiation has been proposed. However, the proponents have also recognised that classification of knowledge work is not a straightforward task, partly due to the generic use of term knowledge worker, and partly because of the potential downsides of explicit segmentation of knowledge workers in organisations, such as perceptions of elitism or potential contradictions that such segmentation may bring about in relation to meritocracy values (Davenport et al, 2002).

Critics of the knowledge management solutions focused on construction of typologies characterised these as “attempts to circumvent the problem of nebulous concepts by drawing distinctions” (Schneider, 2007, p. 631), arguing that these approaches often fail to clarify how the resultant dimensions interact. More significantly, critics argued that knowledge work belongs to the domain of complex systems, which cannot be managed through direct intervention, standardisation or programming (Schneider, 2007; Snowden, 2002).

Existing classifications of knowledge work include those based on, for example, *type of knowledge activity*; *type of idea*; or *process attributes* involved (Davenport, 2005). One of the most prominent typologies of knowledge work is the “Classification Structure for Knowledge-intensive Processes” (Davenport, 2005). This typology differentiates knowledge workers across two key dimensions (Figure 1):

- 1) The level of *complexity* of knowledge work, characterised by extent of interpretation and judgement required to accomplish work, ranging from routine to work where high levels of personal expertise and judgement are required
- 2) The level of *interdependence* required to achieve work tasks, ranging from work that is accomplished primarily by individual actors to work that is carried out by collaborative groups

<Take in Figure 1>

The author acknowledges that the typology was based on an earlier version developed by Donoghue, Harris and Weitzman (1999) to describe different strategies for knowledge management. As an examination of this source reveals, Donoghue et al (1999) present an identical typology, which they call “Knowledge management framework: Work models” (see *ibid*, p. 50).

The issue of the origin of this typology aside, the extent to which this model is grounded in empirical data is unclear. Davenport indicates that it is derived from his extensive experience as a management consultant (Davenport, 2005). However, he provides no information regarding a processes and methodology of the development and validation of the typology.

The aim of the study reported in this paper was to test the validity of Davenport’s classification structure. For succinctness, we refer to this model as “Davenport’s typology”. To start with, we conducted an extensive literature search to identify any empirical studies on this typology. The literature search involved a systematic analysis of both peer-reviewed and non-peer reviewed literature, including journal articles, conference and white papers and book chapters. The following criteria for inclusion of resources were used: (a) empirical – must address the validation of the model, rather than being merely a theoretical discussion or a review; and (b) published in or after 1999 (ie when the original typology was published). The literature search was conducted via Google Scholar as well as a range of specialist databases, namely ProQuest, ERIC and ISI Web of Knowledge. Our literature search revealed that while many papers referenced the typology, no papers reported empirical data validating the typology. We found only one paper that critiqued the typology (discussed in detail below). We then conducted a questionnaire survey amongst knowledge workers in a global multinational company in the energy sector, in order to test the validity of the typology. The sample included engineers, scientists, learning and training specialists, contracting and procurement, human resource and health and safety professionals, among others.

In this paper, firstly we provide a more detailed description of Davenport’s typology, positioning it in the context of some other classification approaches proposed by him. Secondly, we describe the methodology and the instruments of data collection and analysis. Thirdly, we present and discuss the findings. Finally, we conclude by discussing the implications of our findings and propose future directions for research.

## **Existing approaches to classification of knowledge work**

While a comprehensive review of all the existing knowledge work classifications is beyond the purpose of this paper, in this section selected typologies are discussed to characterise the context of current work. One approach to classifying knowledge work processes is based on the *type of knowledge activity* (Davenport, 2005), namely finding, creating, packaging, distributing or applying knowledge. It is premised on the assumption there are qualitative differences between different types of knowledge work focused on different types of knowledge activities. Example include scientific research, primarily focused on creating knowledge, or editorship or nursing predominately focused on packaging or application of existing knowledge.

Another approach distinguishes knowledge workers on the basis of the *types of ideas* that form the core of their activities. These range from ideas focused on developing cutting edge innovations, such as radically new products or services, to ideas that are focused on more incremental changes and minor improvements to existing processes or products (Davenport, 2005). This approach could be argued to be similar to the classification on the basis of type of knowledge activity, whereby radically new ideas could be said to be an outcome of knowledge creation activities, whereas incremental improvements are more likely to be associated with application of existing knowledge.

A third approach is based on the *process attributes* underpinning knowledge work (Davenport, 2005), namely parallel of sequential processes. In parallel processes, all workers perform the same steps at the same time, whilst sequential processes require each worker to perform only one or two steps in a process. For example, parallel processes can be found in a call centre, and sequential processes are predominant in credit approval in a bank. In addition, this typology suggests that processes underpinning knowledge work may range from those having low recurrence to those having high recurrence rate.

In contrast, Davenport's "Classification Structure for Knowledge-intensive Processes" (2005) is premised on the assumption that knowledge work can be categorised in accordance with two key dimensions: the extent of *complexity of work*, and the extent of *collaboration required to carry out the work* (Figure 1). Davenport suggests that the reason to consider these dimensions is that they pose different requirements for structure and the amount of knowledge required to perform work. He gives the following examples of jobs that could fit the quadrants. For instance, call centre staff can be classed as transaction workers (low complexity, low interdependence). IT staff can be classified as integration workers (low complexity, high interdependence). Investment banking fits collaboration model (high complexity, high interdependence), while general practitioner doctors would operate in the expert model (high complexity, but low interdependence).

While it appears that Davenport's typology has not been empirically tested, it has been critiqued by Aarons, Lingter and Burstein (2006), who pointed out "*significant weaknesses*" (p. 2) of this classification. In particular, they emphasised the problematic nature of an implicit assumption underpinning the typology that different types of knowledge work can be positioned exclusively in either one of the four quadrants. Furthermore, Aarons et al (2006) described examples, collected from empirical studies, of complex forms of knowledge work that simultaneously fit different quadrants of the typology. They concluded by saying: "*It is clear that Davenport's characterisation... is at best incomplete, and at worst fatally flawed.*" (Aarons et al, 2006, p. 11). While they acknowledge the potential usefulness of the typology as a classification tool, they point out its shortcomings as an analytical tool, because "*it obscures the true complexity of knowledge work contexts, ... gives no account of the relationship between the pragmatic and cognitive dimensions of knowledge work (let alone integrate them), and gives a flawed account of the relationship between individual and group knowledge work in cases of collaborative activity*" (Aarons et al, 2006, p. 12).

Donoghue et al (1999) as well as Davenport himself (2005) acknowledge that there can be no *fixed* mapping between work process and a work model because the same process can be performed in different ways. However, Donoghue et al (1999) insist that a core process can be mapped onto one of the four categories, but their argument suggests that they seem to be content with a rather crude generalisation.

However, just as the typology itself appears not to be empirically grounded, so the existing critique of it is largely speculative. Therefore, an empirical study to test the validity of the typology is timely. Ultimately, this study aims to contribute to improving our understanding of knowledge work, both in terms of research and practice in knowledge management in organisations.

## **Methodology**

### ***Data collection method, instrument and procedure***

Data was collected using a questionnaire survey. Designed for a larger study (Margaryan, Milligan and Littlejohn, 2009), the survey is based on an existing instrument, Organizational Context Diagnostic (Cross and Parker, 2004), which for the purposes of this study was extended to include a number of additional questions, including a section specifically related to the Davenport's typology. The questionnaire was pilot-tested by a sample of professionals from the company (n=62) and refined. The

reliability estimate, equivalent to Cronbach's alpha, confirmed excellent internal consistency of the instrument ( $\alpha = .88$ ). The full questionnaire is included in the Appendix.

The particular section focused on Davenport's typology included 11 statements, which were derived from the 12 characteristics outlined in the typology (Figure 1), including 3 statements for each quadrant representing different type of knowledge work. Respondents were asked the following question: "What types of work tasks listed below most closely describe your current job". Respondents could choose any number of options that applied. The 11 options listed were:

1. My work involves mostly routine tasks
2. My work is highly reliant on formal rules and procedures
3. My work is dependent on low-discretion information
4. My work involves tasks that are mostly systematically repeatable
5. My work is reliant on formal processes, methodologies or standards
6. My work is dependent on integration across functional boundaries
7. My work is improvisational
8. My work is highly reliant on deep expertise across functions
9. My work is dependent on fluid deployment within flexible teams
10. My work is highly dependent on my personal judgement
11. My work is highly reliant on my individual expertise and experience

The statements map onto Davenport's typology as follows: Transaction model (statements 1-3); Integration model (4-6); Collaboration model (7-9); and Expert model (10-11). The third characteristic of the Expert model in Davenport's typology ("Dependent on star performance") was omitted because the essence of the Expert model was better captured in the other two characteristics ("Judgement-oriented work" and "Highly reliant on individual expertise and experience"). To avoid respondent bias, the four knowledge work types (Integration, Transaction, Collaboration and Expert) were not specified in the questionnaire. However, we acknowledge that the non-random ordering of statements, as well as the similarities in wording of some of the statements may have introduced respondent bias.

The questionnaire was distributed online, through SurveyMonkey web survey service. A link to the survey was posted on the discussion fora of six global knowledge sharing networks focused thematically around the core technical and commercial disciplines of the company. In addition, the survey was circulated through the mailing list of a seventh network, which does not utilise a discussion forum and which is a generic knowledge sharing network aimed specifically for graduate hires. Members of the seven networks were invited to complete the survey through messages posted by network coordinators. The survey was open for four weeks between September and November 2008.

### ***Data analysis procedure***

Survey data was tabulated and analysed using SPSS software package. Firstly, the responses on Davenport's eleven items were analysed descriptively, summarising the total results for each item. Secondly, the data were factor-analysed in order to determine the groupings arising from the responses and to compare these with the categories proposed in Davenport's typology.

### ***Respondents and sample representativeness***

Respondents were all knowledge workers, including engineers, scientists, learning and training professionals, knowledge management advisors, and contracting and procurement, human resources as well as health and safety specialists, in both managerial and non-managerial, technical roles.

The results reported in this paper are based on the total of 459 survey respondents. Recruiting respondents for the survey through the knowledge sharing networks introduced a sampling bias. These networks are large (with a combined membership of more than 30.000 members across the networks included in the current analysis), but only a fraction of users are active, therefore the link to the survey is likely to have been seen by only the most active members of these networks. The fraction of member who have accessed and responded to the survey has representation from all geographic locations, many job roles and experience levels as described below. This suggests that our sample is broadly representative of the target population (knowledge workers in a global company).

Respondents were drawn from a range of countries and geographic areas including Europe (Netherlands, UK, Russia and others), America (USA, Canada and others), Africa (Nigeria and others), Middle East, Malaysia, Brunei and other Asian countries. The most represented countries were The Netherlands (17.4%), US (14.6%), and UK and Nigeria (9.4% each). It is important to note that our data does not allow us to determine whether or not the respondents were originally from these geographic areas, only that they were based in these countries/geographic areas at the time of the survey.

Respondents were asked to indicate years of experience working in their area of expertise, their reported length of time working for this particular company and their reported length of time working in their current role. With regards to the experience in their particular domain, 46% were experienced or very experienced (ie they had 11-20 or more than 20 years of experience); 30% were novices (3 or fewer years of experience); and 24.2% were midcareer professionals (4-10 years of experience). In terms of the time worked within the company, 47.4% were relatively new to the company, having worked there for 3 or fewer years; 30.8% had worked in the company for 11 or more years; and 21.8% spent between 4-10 years with the company. In relation to the length of time in the current role, the population was split in the following way: 77.2% were relatively new to their job role (3 or fewer years); 18.6% had spent between 4 and 10 years and 4.1% 11 or more years in their current job.

## Results

Firstly, the responses on each item of Davenport's typology were summarised (Table 1):

**Table 1. A summary of responses on the eleven items of the Davenport's typology**

Statement	Yes
My work involves mostly routine tasks	84 (18.3%)
My work is highly reliant on formal rules and procedures	206 (44.9%)
My work is dependent on low-discretion information	37 (8.1%)
My work involves tasks that are mostly systematically repeatable	101 (22.0%)
<b>My work is reliant on formal processes, methodologies or standards</b>	<b>283 (61.7%)</b>
<b>My work is dependent on integration across functional boundaries</b>	<b>315 (68.6%)</b>
My work is improvisational	157 (34.2%)
My work is highly reliant on deep expertise across functions	200 (43.6%)
My work is dependent on fluid deployment within flexible teams	147 (32.0%)
My work is highly dependent on my personal judgement	206 (44.9%)
<b>My work is highly reliant on my individual expertise and experience</b>	<b>317 (69.1%)</b>

Secondly, data were categorised according to the four models of Davenport's typology, in order to analyse the number of participants who could be grouped into one category only. The results are:

- Transaction model - 0.7% of total respondents
- Integration model - 4.2%
- Collaboration model - 0.4%
- Expert model - 2.6%

However, the vast majority of respondents (92.1%) could not be grouped into any one category only. Table 2 displays all combinations found, spanning across all or some of the models identified.

**Table 2. A summary of the various groupings found**

Combinations of models found	Respondents
All models	127 (27.8%)
Integration, Collaboration and Expert models	117 (25.7%)
Transaction, Integration and Expert models	49 (10.7%)
Transaction and Integration models	31 (6.8%)
Integration and Expert models	27 (6.0%)
Integration and Collaboration models	24 (5.3%)
Transaction, Integration and Collaboration models	22 (4.8%)
Collaboration and Expert models	13 (2.9%)
Transaction, Collaboration and Expert models	4 (0.9%)
Transaction and Expert models	4 (0.9%)
Transaction and Collaboration models	2 (0.4%)

Thirdly, the data was analysed using a principal component analysis (PCA) with orthogonal varimax rotation. The factor analysis has produced a 4-factor solution that accounted for 54.96 % of the variance. Table 3 shows the factor loadings. Examination of the rotated component matrix revealed that the first factor was defined by high loadings on five items. The second factor was defined by high loadings on three items. The third factor was also defined by three items. The fourth factor was defined by two factors.

**Table 3. Factor analysis results**

	Factor			
	1	2	3	4
My work involves mostly routine tasks	-.205	<b>.759</b>	.095	.017
My work is highly reliant on formal rules and procedures	-.093	.248	<b>.685</b>	.036
My work is dependent on low-discretion information	<b>.303</b>	<b>.645</b>	.015	-.045
My work involves tasks that are mostly systematically repeatable	-.147	<b>.702</b>	.170	-.069
My work is reliant on formal processes, methodologies or standards	.082	.075	<b>.770</b>	-.050
My work is dependent on integration across functional boundaries	<b>.650</b>	-.185	.222	-.024
My work is improvisational	<b>.588</b>	.051	-.367	.177
<i>My work is highly reliant on deep expertise across functions</i>	<b>.438</b>	-.103	<b>.321</b>	.226
My work is dependent on fluid deployment within flexible teams	<b>.695</b>	.045	-.107	.097
My work is highly dependent on my personal judgement	.180	.033	-.154	<b>.771</b>
My work is highly reliant on my individual expertise and experience	.045	-.104	.127	<b>.805</b>
Eigenvalues	2.13	1.67	1.20	1.05
% of variance	19.34	15.16	10.87	9.59

Due to low variance in the item “My work is highly reliant on deep expertise across functions” (highlighted in italics in Table 3) it was excluded from further analysis. One item - “My work is dependent on low-discretion information” – loaded on two factors (1 and 2). Table 4 details the resultant four clusters of knowledge work.

**Table 4. Clusters of knowledge work and their relation to Davenport’s typology**

Item number	Item description	Model in Davenport’s typology
<b>CLUSTER 1. Low-agency collaboration</b>		
3	Dependent on low-discretion information	Transaction
6	Dependent on integration across functional boundaries	Collaboration

7	Improvisational work	Collaboration
9	Dependent on fluid deployment within flexible teams	Collaboration
<b>CLUSTER 2. Low-agency routine work</b>		
1	Involves mostly routine tasks	Transaction
3	Dependent on low-discretion information	Transaction
4	Involves mostly systematically repeatable tasks	Integration
<b>CLUSTER 3. Rule-based work</b>		
2	Highly reliant on formal rules and procedures	Transaction
5	Reliant on formal processes, methodologies or standards	Integration
<b>CLUSTER 4. High-agency expert work</b>		
10	Highly dependent on personal judgement	Expert
11	Highly reliant on individual expertise and experience	Expert

## Discussion

As Table 4 shows, of the four models of Davenports' typology, only the Expert model was confirmed (Cluster 4). Davenport's Collaboration model was reflected in Cluster 1, but it was found to have elements of the Transaction model, in particular the dependency on low-discretion information. This may reflect perceived low agency. "Agency" refers to one's perception of the extent to which one can make decisions and judgements on his or her own in his or her job (a term that is well established in sociological and psychological literature, see for example Giddens, 1991). Therefore we termed Cluster 1 "low-agency collaboration".

Furthermore, neither the Transaction nor the Integration model of Davenport's typology were confirmed. Instead, two further models emerged (reflected in Cluster 2 and 3 respectively) that incorporate elements of both Transaction and Integration models. We termed Cluster 2 "low-agency, routine work", and Cluster 3- "rule-based work". Finally, Cluster 4 was termed high-agency expert work.

These clusters, or knowledge work models, do not appear to fit a matrix structure. "Agency", ranging from low (Clusters 1 and 2) to high (Cluster 4) is one dimension that seems to emerge clearly. Cluster 3 – Rule-based work model – appears to stand on its own, and does not reflect either the agency dimension that emerged from our analysis, nor the interdependence or complexity dimensions that form the basis of Davenport's typology.

While a follow-up, qualitative study, would be required to better understand the four models that emerged from our survey, we could hypothesise that in this particular organisation, knowledge work appears to be highly formalised, i.e. being subject to formal procedures, standards and methodologies. This may be partly explained by the global nature of the organisation, where many core processes tend to be highly structured and standardised across the organisation. Structure and rules appear to be a key part of the knowledge work in this organisation, and these may explain the presence of low-discretion elements in the two of the four models we uncovered. On a more fundamental level, is this pointing towards the old ontological issue of agency versus structure? In this organisation, structure and recurrent formalised arrangements appear to influence knowledge workers' perceptions of the extent of decision making that they are able to exert over their jobs.

## Conclusions and future research

In summary, this paper described a study that empirically tested Davenport's typology of knowledge work. We conducted a questionnaire survey among knowledge workers in a large, global, multinational

organisation in the energy sector. Survey respondents included 459 knowledge workers of various levels of experience, from a range of geographic regions and job types. We found, firstly, that the vast majority of the respondents (92.1%) could not be grouped into any one of Davenport's four knowledge work types only. Secondly, a factor analysis revealed four new groupings, which only marginally reflected Davenport's typology. The clusters were termed as follows: Low-agency Collaboration; Routine Low-agency Work; Rule-based Work; and High-agency Expert Work. Our results confirm only one of the four models of Davenports' typology, the Expert model. Davenport's Collaboration model, though reflected in our findings, was found to have elements of the Transaction model. Neither the Transaction nor the Integration model of Davenport's typology were confirmed. Instead, two further models emerged that incorporate elements of both Transaction and Integration models.

As well as empirically testing and validating Davenport's knowledge work typology that has been widely cited in the literature, this study contributes to both research and practice of knowledge management, by improving our understanding of knowledge work in organisations. While a knowledge work typology could be a useful tool for planning and supporting knowledge work within organisations, the existing typologies tend to be conceptual rather than empirically-based. Furthermore, the existing typologies do not offer a holistic view of the tasks that knowledge workers are engaged in, and do not reflect the dynamism of knowledge work. Future research could focus on comparative studies in different types of organisations, using mixed method, quantitative and qualitative, approaches. Follow-up qualitative studies could, for example, help to elucidate organisational-contextual factors that underpin knowledge work models that emerged from our study, to collect and describe examples of jobs representing each model, and to explore in-depth the rationales and conditions underpinning knowledge workers' perceptions of agency.

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## Appendix. Survey Questionnaire

### 1. Background information and Informed consent

YYYYYY YYYYYY YYYY and XXXXXXXXXXXXXXX are engaged in an action research partnership aimed at developing innovative learning approaches. As a part of the action research partnership, this study investigates ways in which individuals create, consume and share knowledge. The study explores perceptions about the impact of knowledge sharing on learning, development and work. It analyses activity patterns and strategies used by individuals during planning, implementing and reflecting upon their learning and development goals. The outcomes of the study will be used to inform the development of processes and systems that can improve learning and knowledge flow within the organisation.

Completing the questionnaire will take ten minutes of your time.

Thank you for your support.

\*Note: Your participation in this study is voluntary. If you choose not to participate or to withdraw from the survey, you can do so at any time. The results of the research study may be published but your name will not be used and the results will be maintained in confidence. Your anonymity is guaranteed and the information collected from you will remain confidential in terms of how you responded to each of the questions.

**By selecting "Yes" and clicking "Next" to proceed with this survey, I acknowledge that I understand the nature of the study and the means by which my identity will be kept confidential.**

- Yes  
 No

### 2. Your Background

**In this section we will ask some general questions about you and your role in XXXX.**

**How many years of experience do you have in your area of expertise?**

- Less than 1 year  
 1 - 3 years  
 4 - 10 years  
 11 - 20 years  
 More than 20 years

**How long have you worked for XXXXXXXXXXXX?**

- Less than 1 year  
 1 - 3 years  
 4 - 10 years

- 11 - 20 years
- More than 20 years

**How long have you been in your current role?**

- Less than 1 year
- 1 - 3 years
- 4 - 10 years
- 11 - 20 years
- More than 20 years

**In which country do you currently work?**

**Are you a supervisor/line manager with staff reporting to you?**

- Yes
- No

**Please provide your job title in the box below.**

**Do you consider yourself to be an expert\* in your discipline?**

**\*expert refers to an individual who is known as an expert by reputation amongst his/her peers or in his/her community and NOT the XXXXXX definition.**

- Yes
- No

**Do other people consider you to be an expert\* in your discipline?**

**\*expert refers to an individual who is known as an expert by reputation amongst his/her peers or in his/her community and NOT the XXXXXXXXXX definition.**

- Yes
- No
- I don't know

**Do you know who the experts\* in your discipline are?**

**\*expert(s) refers to an individual who is known as an expert by reputation amongst his/her peers or in his/her community and NOT the XXXXXX definition.**

- Yes
- No

**In a typical working day, how long do you spend working at your computer?**

- Less than 1 hour
- 1 to 2 hours
- 3 to 4 hours
- 5 to 6 hours
- More than 6 hours

**What types of work tasks listed below most closely describe your current job?**

**(Check all options that apply)**

- My work involves mostly routine task
- My work is highly reliant on formal rules and procedures
- My work is dependent on low-discretion information
- My work involves tasks that are mostly systematically repeatable
- My work is reliant on formal processes, methodologies or standards
- My work is dependent on integration across functional boundaries
- My work is improvisational
- My work is highly reliant on deep expertise across functions
- My work is dependent on fluid deployment within flexible teams
- My work is highly dependent on my personal judgement
- My work is highly reliant on my individual expertise and experience

**3. Your Online Community**

In this section we wish to find out about your participation in an online community.

**What online community do you participate in most frequently?**

- XXX Network
- Other community (including external to XXXXXXXXXXXX)  
(please specify)

**How frequently do you participate in this online community?**

	Daily	Weekly	Monthly	Quarterly	Never
<b>I read on average</b>	<input type="radio"/>				
<b>I post on average</b>	<input type="radio"/>				

**Please select the choice that MOST represents what happens in your work environment.**

	Disa gree	Agree	Don't Know
<b>Participation in my online community helps me to solve problems in my daily work</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Participation in my online community helps me to improve my daily work practice</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Contributions by others help me to generate new knowledge</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>My contributions to my online community help others to generate new knowledge</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>My contributions are considered to be useful by other community members</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>I share knowledge I have gained beyond my online community</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>My contributions to my online community have had a direct impact on the business</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Participation in my online community is a valuable source of</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

learning and development for me

My manager actively participates in my online community

The leaders of my organisation actively share their knowledge within my online community

The experts of my organisation actively share their knowledge within my online community

Have you established individual collaborations (e.g. projects) with other members of your online community as a result of your participation in it?

Yes

No

Have you encouraged your peers to become more active members of your online community?

Yes

No

Do you draw upon your online community when you undertake your annual 'preformance review' process?

Yes

No

Please indicate the choice which most represents your attitude to the following statement:

Disagre e    Agree    Don't Know

I feel there is a direct connection between my participation in my online community and the goals I have set through Performance review.

How often do you use the following?

	Daily	Weekly	Monthly	Quarterly	Never
XXXXXXXX Wiki	<input type="radio"/>				
Blogs	<input type="radio"/>				
'Shared Document Space'	<input type="radio"/>				
XXXXXX Physical or Digital Libraries	<input type="radio"/>				
Learning Tools (electronic courses, eLearning)	<input type="radio"/>				
XXXXX Online Portal	<input type="radio"/>				
LiveMeeting or NetMeeting	<input type="radio"/>				
'Link Sharing'	<input type="radio"/>				
Personal resources which I have collected and shared with others	<input type="radio"/>				
Personal resources which I have collected but do not share	<input type="radio"/>				

(please specify)

Please list up to three external resources which you use frequently to support you in your work (these may be physical resources - books or libraries - or may be electronic resources or tools such as electronic libraries, Wikipedia, or del.icio.us).

#### 4. Individual and Organisational Factors

Select the choice that most represents your opinion about each statement.

	Disagree	Agree	Don't Know
I have a personal responsibility to share knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel personal satisfaction when I share knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel more motivated to share knowledge when this is directly related to my work goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing knowledge is an effective way of ensuring I make progress in my career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing my knowledge makes me less valuable to the organisation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing my knowledge leads to benefits when putting myself forward for new projects or promotion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowledge I have gained from my colleagues has helped me further my career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The degree to which I engage in knowledge sharing plays a significant part in my performance appraisal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Select the choice that most represents your opinion about each statement.

	Disagree	Agree	Don't Know
I am encouraged by my manager to share knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My manager gives me regular feedback on my knowledge sharing efforts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My manager recognises my knowledge sharing efforts in my appraisals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My manager provides the time needed to share my knowledge with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaders in my organisation believe that knowledge sharing adds value to the organisation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaders make an attempt to involve new staff in knowledge sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaders direct people to those with relevant expertise rather than forcing people to come to them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaders are active and effective communicators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Processes are in place that make it easy for me to share knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People are not afraid to admit lack of knowledge in the workplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I prefer to learn from (please select one choice or indicate an alternative):

- Courses

- Participation in my community
  - Coaching or mentoring
  - Other means
- (please specify)

**What one thing would you start to do to improve the way you consume and create knowledge, and connect with others.**

**What action would you stop, because it decreases your ability to consume and create knowledge, and connect with others?**

**Aside from everything we have asked you, is there anything else you think we need to know?**

### **5. Thank you**

Thank you for taking the time to participate in this survey.

**If you would be willing to participate in the next stage of this research study by volunteering to be interviewed, please provide your email address in the box below. Note: you will not be identified in the research study, you will remain anonymous.**

## Authors' Autobiographical Notes

### Author 1 (Corresponding Author)

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Brief professional biography: Dr. Anoush Margaryan is a Lecturer in the Caledonian Academy, Glasgow Caledonian University, where she leads a research programme on work-related learning (WRL). She has sixteen years' experience in research, development and teaching in the field of Learning Sciences and Technology, both in Higher Education and in the corporate learning sector. She studies how professionals in knowledge-intensive domains learn and develop their expertise in the context of daily work and how digital technology can be used to support knowledge work and learning. Anoush has over 50 publications, including a book on work-based learning.

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Brief professional biography: Dr. Colin Milligan is a Research Fellow with the Caledonian Academy at Glasgow Caledonian University. He has worked in the area of educational development for around eighteen years. His research interests centre on the role of the collective in learning in the workplace, and the role social technologies can play in supporting knowledge workers

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