Experiencing Information Use for Early Career Academics' Learning: A Knowledge Ecosystem Model

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Structured Abstract

Purpose: This study explores the informed learning experiences of early career academics while building their networks for professional and personal development. The notion that information and learning are inextricably linked via the concept of 'informed learning' is used as a conceptual framework to gain a clearer picture of *what* informs early career academics while they learn and *how* they experience using that which informs their learning within this complex practice: to build, maintain and utilise their developmental networks.

Methodology: This research employs a qualitative framework using a constructivist grounded theory approach (Charmaz, 2006). Through semi-structured interviews with a sample of fourteen early career academics from across two Australian universities, data were generated to investigate the research questions. The study used the methods of constant comparison to create codes and categories towards theme development. Further examination considered the relationship between thematic categories to construct an original theoretical model.

Findings: The model presented is a 'knowledge ecosystem', which represents the core informed learning experience. The model consists of informal learning interactions such as relating to information to create knowledge and engaging in mutually supportive relationships with a variety of knowledge resources found in people who assist in early career development.

Originality/Value: Findings from this study present an alternative interpretation of informed learning that is focused on processes manifesting as human interactions with informing entities revolving around the contexts of reciprocal human relationships.

Keywords: Informed Learning; Information Experience; Knowledge Ecosystem; Informal Learning; Early Career Academics.

Article Classification: Research Paper

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Introduction

This article explores the informed learning experiences of early career academics (ECAs) while building their 'developmental networks' (Higgins & Kram, 2001) for professional and personal learning and development. The notion that information and learning are inextricably linked via the concept of 'informed learning' (Bruce, 2008) is used as a conceptual framework to gain a clearer picture of *what* informs early career academics while they learn and *how* they experience using that which informs their learning within this complex practice: to build, maintain and utilise their developmental networks. Themes of human relationship building (Cross & Sproull, 2004; Hopwood, 2010), high quality connections (Dutton & Heaphy, 2003) and developmental networking (Baker Sweitzer, 2009; Higgins & Kram, 2001) in the context of the growing use of social, collaborative technologies blended with traditional communication methods, suggest an increasingly complex information practice (Miller, 2008, Miller & Wallis, 2011) particularly for the beginning university academic. The complexity of this networking 'landscape' is suggested in the developmental networks literature (Chandler & Kram, 2005; Higgins & Kram, 2001), which defines a developmental network as a type of social network:

> The key distinction between an individual's social network and his or her developmental network is that the former includes all social ties, whereas the latter includes only those that are identified as of particular importance to career growth and personal learning (Chandler & Kram, 2005, p. 548).

A key factor in the successful development of universities is the quality of its support system, particularly for early career academics (Coates et al, 2009; Foote, 2010; Greene et al, 2008; Sutherland & Petersen, 2010). For this group of academics, it is increasingly being recognised that the quality of their research

and teaching outcomes, in establishing themselves as professional academics, is largely dependent on their ability to effectively build and make use of a 'developmental network' (Higgins & Kram, 2001) involving supportive learning relationships with a range of people in both professional (academic and industry) and personal contexts (Baker Sweitzer, 2009; Hopwood, 2010; Kenway, Epstein & Boden, 2005).

This article will provide background into the conceptual framework used for this study, as well as a description of the constructivist grounded theory methodology used to develop the theoretical model of a 'knowledge ecosystem' of early career academics. After a presentation of the model, some theoretical implications and recommendations for future research based on these findings are discussed.

Conceptual Framework: Informed Learning

Conceptual models towards understanding how information is used in learning contexts have emerged from a range of theoretical perspectives influenced by the domains of information behaviour and information literacy. Information behaviour perspectives include educational informatics (Ford, 2004) and information services for improving information literacy (Huvila, 2012), while information literacy has been studied from socio-cultural (Lloyd, 2006; Wang et al, 2011), phenomenological and relational perspectives (Limberg et al, 2012). Previous studies into relational information literacy in higher education contexts have increased our understanding of various information and learning experiences across educational and workplace spaces (i.e. Andretta, 2012; Boon, Johnston & Webber, 2007; Bruce, 1997).

However, there are currently no studies which explore the role of information or information use in the specific area of learning experiences associated with early career academics' networking across multiple spaces (i.e. educational, workplace

and community) within and outside of universities. Furthermore, previous studies into relational information literacy in the higher education arena have typically employed interpretive phenomenographic approaches. In order to uncover novel perspectives, researchers have begun to explore various experiences of using information to learn (limited to secondary education contexts) through alternative methodological approaches such as grounded theory (Harlan, Bruce & Lupton, 2012) and action research (Whisken, 2011). As learning is experienced differently by participants in secondary and higher education, this research aims to fill these gaps in knowledge by providing an alternative perspective of experiencing information use for learning in higher education, using a constructivist grounded theory approach to the relational perspective.

The overarching conceptual framework used for this study is the theory of informed learning, as conceptualised by Bruce (2008). Bruce (2008) defines the concept of informed learning as 'the use of information for learning', which has emerged from:

> ….a growing body of evidence suggesting that information and information use could be regarded as mediators between learning intent and learning outcomes. If we understand information literacy as being about using information to learn, we can draw on information use or information practices to help secure the learning outcomes we seek. Information use becomes one dimension of that complex phenomenon we know as learning. Being aware of the role of information and its uses becomes an avenue for improving learning. Treating information use and learning as closely related enhances the learning experience (Bruce, 2008, p. 17).

Informed learning (the use of information for learning) was selected as the conceptual framework for this study as the key information practice to be examined is a learning activity and concept (developmental networking of ECAs within and outside of the higher education context). The term 'informed learning' also has the potential to reach the broader, cross-disciplinary audience (within

information and non-information disciplines) that this study aims to inform and influence, as one of the key principles of informed learning is that information and learning are closely connected and are simultaneous (Bruce, 2008). This is important as it can potentially facilitate more collaborative understandings and practices between information and non-information disciplinary contexts.

Foundations of 'Informed Learning'

The notion of 'informed learning' fundamentally represents the relational approach to information literacy. Informed learning as a concept originated from the 'Seven Faces of Informed Learning' model developed by Bruce (2008). This current model has been adapted from her earlier model 'The Seven Faces of Information Literacy' (Bruce, 1997). Bruce developed informed learning as:

> …an extension of the relational model for information literacy and information literacy education (Bruce, 1997). The relational model emphasises the importance of uncovering variation and establishes the importance of 1) interpreting the phenomena of *information use* and *information* from an experiential or relational perspective and 2) interpreting information literacy education as bringing peoples' information practices (professional, disciplinary or civic) into the curriculum (Bruce, 2008, p. 131).

As informed learning is based on the relational model of information literacy, it is important to understand the meaning of 'relationality' as a key principle of informed learning. Andretta (2012) traces the origins of the relational approach to information literacy using phenomenography, where "subject-object relation is examined through the structure of awareness" (p. 20). When this phenomenographic principle is used for understanding information literacy, as discussed by Bruce (1997) "the object part of the subject-object relation is information… information literacy may be described as a series of varying relations between people and information." (Bruce, 1997, p. 111). Thus, informed learning is strongly influenced by the notion of 'subject-object' (or 'learner-information') relation.

Informed learning is learner-centred, reflected in one of its key principles of 'second-order perspective', which means taking into account learners' experiences (Bruce, 2008). The concept aims to expand the repertoire of learners' experiences and to help them adopt the full range of possible experiences, thus contributing to improving the quality of learning (Bruce, 2008). While information literacy is the ability to draw upon different ways of experiencing using information to learn, informed learning is an interdisciplinary concept which is supported by previous research into student learning and different ways of experiencing teaching and assessment (Bruce, 2008). However, while the concept of informed learning has emerged and evolved from the formal learning environment, the theory also seeks to be used to understand and improve quality of learning within information practices in a variety of contexts outside of formal education, such as workplace, community and social life, where informed learning could contribute to our understanding of learning in informal environments.

Relevant to this study is the social constructivist approach to conceptualising information literacy in the workplace, which highlights the collaborative nature and relational dimensions of information literacy as central to learning specific tasks and activities within a professional practice context (Bruce, 1999; Lloyd, 2007). It important to note that within the social constructivist approach, the relational (as developed by Bruce (1999)) and socio-cultural (as developed by Lloyd, 2007) approaches to conceptualising information literacy are contrasting and potentially complementary, in that the relational approach encompasses subject-object relation, while the socio-cultural approach emphasises a human relations perspective (Lloyd, 2007).

Research Questions

The chosen qualitative research approach of constructivist grounded theory (Charmaz, 2006) recommends that researchers should start with no more than one broad and open research question, so as not to restrict the investigation. Therefore, this study began with the following research question:

How do early career academics use information to learn as they build their developmental networks?

During the first phase of the study, the research question was refined as:

How do early career academics experience using information to learn while building their developmental networks?

A second question arose from the first phase, which focused on identifying what was informing their learning:

What informs early career academics' learning while they build their developmental networks?

Methodology

This study employed constructivist grounded theory methodology. The constructivist paradigm emphasises personal, subjective making or construction of reality (Williamson, 2002) and a multiple realities/perspectives approach (Charmaz, 2006; Patton, 2002). Closely related to this paradigm is symbolic interactionism, a perspective "which assumes that individuals are active, creative and reflective and that social life consists of processes." (Charmaz, 2006, p. 189). Mills, Bonner, and Francis (2006, p. 9) outline three theoretical principles of constructivist grounded theory.

1. The creation of a sense of reciprocity between participants and the researcher in the co-construction of meaning and, ultimately, a theory that is grounded in the participants' and researchers' experience.

2. The establishment of relationships with participants that explicate the power imbalances and attempts to modify these imbalances.

3. Clarification of the position the author takes in the text, the relevance of biography, and how one renders participants' stories into theory through writing.

These broad principles can be suitably used within this study for the following reasons. The notion of co-construction of meaning and theory grounded in both the participants' and researchers' experiences adds great value to the study, to generate new perspectives and concepts that can genuinely represent the 'voices' of a somewhat under-studied group (i.e. early career academics). Being closely linked to the embryonic concepts of informed learning and developmental networking, means the methodology must allow for exploration of any connections and interactions between these broad areas. As the researcher has had significant work experience in higher education alongside other ECAs and could also be defined as an ECA, a theoretical sensitivity from the researcher can effectively facilitate the 'construction' of shared meaning or intersubjectivity.

This process began from the conception of the topic, through informal discussions with other academics, and most significantly, during the interviews where participants are guided by a set of broad questions selected by the researcher. Participants were given the opportunity to reflect on the questions themselves and what they might mean within their own contexts. Although a power imbalance may have existed between participants and researcher (i.e. length of service and types of expertise and professional knowledge of each

participant and the researcher varied), a shared understanding or intersubjectivity was a key goal during the interviews and subsequent interactions through interview transcript checking. Using these principles as guidelines, Charmaz' notion that codes are constructed from the generated data, rather than arising from the data, was of primary importance for this study.

The Participant: Selection and Sampling

The technique of 'purposive sampling' (Pickard, 2013) was used to identify and select suitable participants. This allowed the researcher to define specific criteria for participating in the research and to target and locate participants based on these criteria. As the researcher was interested in examining early career academics' use of information to learn while developmental networking, the following criteria were used. Participants:

1) must be an early career academic - an academic within their first five years of a full time permanent appointment to a university Faculty, who engages in both teaching and research activities;

2) must have significant industry/professional experience before joining academia; and

3) must have experience with networking for professional and personal development towards learning how to be an academic.

The cohorts of potential participants were identified through consideration of their availability, disciplinary diversity and ability to engage with enough data to 'saturate' categories. The researcher expected to generate wider and richer networking experiences from participants with relevant industry backgrounds. All participants had between approx 3-10 years of industry experience relevant to their current teaching and research, and this was important as the knowledge from their industry experiences added to the quality of their teaching and

research. Academics with no relevant industry experience were excluded, as they would have provided limited data outside of the traditional academic environment.

The number of participants was guided by the grounded theory position on saturation, Constructivist grounded theory's data generation process involved reaching theoretical saturation through diversity of data generated from a minimum of ten participants (Charmaz, 2006). Saturation was reached when no new concepts could be constructed from the data.

Generating Research Data

Research data were generated from the two phases of this study: 1) phase one consisting of eight semi-structured interviews and preliminary analysis, and 2) phase two consisting of fourteen semi-structured interviews (including the first eight interviews) and data analysis incorporating early findings from phase one.

Phase One

Phase one of this study was carried out during the period December 2010 to February 2011. The first phase of data generation consisted of eight semi-structured interviews with ECAs from a range of different disciplines, who met the participant criteria. Interview participants were identified through searching a university communications directory and academic staff web pages online. Sample characteristics were: Eight early career academics based at one campus of a regional Australian university across the Faculties of Education (2), Science (3) and Arts (3).

Phase one of this study was designed to identify preliminary concepts and themes in the research as well as to improve and focus the interview questions for the next phase of the project. Findings from the preliminary data analysis and reflection from phase one of the study provided evidence that the interview

guide and data generation method had developed effectively, through the formation of themes developed from category saturation. This clearly indicated that the interview schedule and interview techniques were well designed for obtaining the necessary amount of quality data to answer the research question and to develop grounded theory. The following sections describe phase one of the study, its participants and interview method. The grounded theory approach, as discussed in earlier sections, was implemented through the following stages of phase one.

Eight interviews lasting approximately forty-five minutes were audio-taped using a digital voice recorder and transcribed by the researcher. Below is the interview guide used in the first phase of the study.

Can you tell me about your position as an early career academic? How long have you been in your position?

Can you tell me about your professional experience prior to becoming an academic?

Can you tell me about your experiences with developmental networking as an early career academic?

How do you use information to learn while building your developmental networks?

In relation to participants' reactions to the term 'developmental networks', the researcher began each interview by giving a general overview of the aims of the project. She then explained that the questions did not have right or wrong answers and that she was interested in their interpretations of the questions. Some participants were comfortable with answering the questions using their own interpretations and did not ask for clarification, while others did ask for a definition of 'developmental networking', and whether the researcher was interested in networking for research or teaching and learning, which some saw

as separate roles. In these cases, the researcher gave them the definition from the literature and that she was interested in hearing their experiences with both research and teaching activities. After this, we were able to discuss their experiences in detail.

Phase Two

Phase two of the study involved exploring the connections (actions and processes) between what informed learning (i.e. information/knowledge types), using informal information to learn, reciprocal relationships between ECAs and their key sources of development (or developers) and their various relationship 'layers' encountered while building their developmental networks. Phase two of the study took place between November and March 2012. Data were planned to be generated from approximately six early career academics located at a different university.

In the second phase of data generation, the researcher chose a second site, an Australian metropolitan university, from which to select and recruit six participants to add to the total sample of fourteen ECAs. Gathering data from two different sites would allow the researcher to identify a greater variation in ECA experiences and any similarities or differences in data patterns. A key difference between the regional and the metropolitan university is the latter provides its ECAs with the opportunity to participate in formal academic development programs. This minor change in methodology was reflected in the research ethics variation approved by Queensland University of Technology. Participants in the second round of data generation were selected in consultation with key gatekeepers of information relevant to this formal developmental program.

Participants were then contacted, scheduled and interviewed by the researcher using the revised interview guide. Six ECAs from a range of disciplines (namely, Business (2), Health (1), Science (2) and Engineering (1), at more than one campus of this university were involved. Participants in the second phase were

interviewed virtually for approximately forty-five minutes. Each interview used Skype videoconferencing where possible, and was recorded using a digital recorder. The researcher also engaged in note taking/memo writing during the interviews, to record impressions of visual experiences of contexts to supplement the voice recordings. The revised question wording of 'what informs you while learning to build your developmental network?' was helpful in facilitating responses that were not limited to their conceptions of information.

The interview process was similar for both rounds, with the only difference being that the second phase of interviews was conducted virtually through videoconferencing. This difference did not affect the quality of the data generated.

Grounded Theory Data Analysis

Once open coding of interview transcripts were carried out, from the initial and line-by-line codes, memos containing early categories were developed. These early categories formed the basis of the themes discussed in the findings. Additionally, early memos outlining preliminary conceptions of early career academics' developmental networks, potential sources of development and early discussion of the information used to learn in this context. Two main categories reached saturation, however in the next phase of the data analysis, further categories and sub-categories were developed from focused coding and compared to findings from the preliminary phase. In the second phase, these preliminary emerging categories were compared to focused codes and categories from the second round of data generation and data analysis to develop final themes and grounded theory.

The literature review was revised to reflect findings from the first phase of the study. Literature reviewed in the preliminary phase of the project, and developments in the literature review as the study progressed, were interwoven into later versions of the theory development.

The researcher transcribed recordings and carried out line-by-line coding on all of the transcripts. A thorough immersion in the data helped the researcher identify and consolidate the two initial categories formed from the first round of data analysis, and to develop stronger categories related to contexts where developmental networks were being formed and experienced. Data analysis in the focused-coding phase targeted key processes (verbs from the transcripts) and these became processes and sub-processes within the major categories. The focused-coding phase was guided by a series of questions generated by the researcher to focus coding.

The majority of open and focused coding and category/theory development was carried out manually using tables in a word processor for engaging with the constant comparison technique and theoretical sampling. NVivo qualitative research software used mainly as a research document organisation tool to visualise relationships between memos, drafts, key categories, participant quotes and relevant research literature. Theory from memoing was then developed from these categories, which eventually became the basis for the theoretical model.

Limitations

It is understood that this research examined early career academics' experiences within particular contexts across different universities. The research involved participants from several academic disciplines within different faculties of universities. This approach may limit the relevance of this study to particular disciplines. However, as the research aimed to contribute to the larger research agendas of informed learning, early career academics and developmental networking, this approach can potentially deepen our understanding of how early career academics use information to learn. The availability of each research participant for more than one interview may have limited the grounded theory approach, which often involves revisiting the initial interview to compare

experiences and understanding with initial theory development (Charmaz, 2006).

Key Findings

What informs early career academics' learning while they build their developmental networks?

This research question can start to be answered by identifying the resources they use during learning experiences. Data analysis revealed that their learning is mainly informed by knowledge - knowledge of oneself and knowledge from a range of people in their professional and personal networks such as informal and formal mentors, industry and academic colleagues, family, friends. Five types of knowledge emerged from the data:

Knowledge Types	Examples
Experiential	lessons from past experience, tacit knowledge, know-how
Personal	social savvy, common sense, trust, empathy
Technical	how-to guides, user reviews
Disciplinary	conversations or reviews within similar discipline or field
Interdisciplinary	conversations or reviews between different disciplines

Table 1: What Informs ECAs' Learning?: Knowledge Types

Each knowledge type refers to knowledge co-created within relationships: knowledge from the new lecturer (knowledge of self) and knowledge from their developers (knowledge of others). Contrastingly, information is discussed as useful for learning but is experienced as secondary to knowledge. Participants in this study view the knowledge types as listed above as more important to their learning than information types listed here. From the data, the following categories of information resources used for learning experiences have been identified:

Information Types	Examples
Texts	articles, books, websites, multimedia, emails
Tools	software, hardware, mobile devices, equipment
Humans	elevator speeches, business cards, online profiles
Culture	organizational or community
Environments	work/home space design, geographical location or political climate

Table 2: What Informs ECAs' Learning?: Information Types

In this study, knowledge is defined by ECAs as an intangible resource that is created through interaction between an individual learner and various people within their developmental networks, known as developers. Information is defined by ECAs as a tangible resource that refers to textual sources, tools or

devices for receiving information, contextual information gained from experiencing cultures and environments, and information stored within individual people that is not being used. When a learner interacts with these tangible information resources, knowledge is created which can inform their learning. In this study it is knowledge, rather than information that is primarily informing the learning of an ECA. Informed learning in this specific context does not fuse information and knowledge, rather the participants in this study experience information and knowledge as separate things with 'stored' intangible knowledge created from interaction with information (tangibles) being more important for their learning. It was a recurring pattern, in that each participant either implied or directly responded to the question 'what informs you… ?" by saying that the most valuable resource for learning was intangible knowledge (from interaction with people).

How do early career academics experience using information to learn while building their developmental networks?

Findings from this study and context present an alternative interpretation of informed learning that is focused on processes manifesting as human interactions with informing entities revolving around the contexts of reciprocal human relationships, in this case between ECAs and their various developers. Informing entities include information resources outside of human relationships, and knowledge resources within human relationships. The processes or interactions were constructed from grounded theory data analysis and are a key element of the experience of building developmental networks. These interactions included:

1) Relating to Information to Create Knowledge of Self and Others; and

2) Building Mutually Supportive Relationships through Knowing Self, Knowing Others and Recognising Layers of Relationships

It is important to note that these interactions constructed from the data are not part of a linear process, but rather iterative and these interactions are linked to different kinds of learning outcomes. The primary interaction is **Relating to Information to Create Knowledge**. Participants interpret 'information use' as any interaction between people and information sources and that when humans use information, it becomes knowledge whether the knowledge remains implicit or becomes explicit. Interacting with different types of knowledge for learning activities is central to this study's conceptualization of informed learning. Using information to learn is described by every participant in this study, as manifested through engaging in development, growth and/or learning through relationships between people. In this study, it is knowledge rather than information, which is recognised by ECAs as a primary resource for their learning and development. The following quotes suggest the idea of knowledge (from people) as informing the development of their learning networks:

> Information is just a piece of paper··· until you can relate it to someone··· knowing who wants it···' (Participant 1)

For the ECA, information is conceptualised as tangible content or text ('a piece of paper'), while knowledge is created ('knowing who wants it') through the interaction of relating to the information ('until you can relate it to someone') for a particular purpose, such as learning. Information remains important, however as the next quotes suggest, ECAs place a stronger emphasis on knowledge that is intangible and fluid, particularly knowing the right people in order to access the most relevant and valuable information.

> The really valuable stuff in networking is not the stuff you can find in a journal or website, Benjamin is who you want to speak to! That sort of thing, you know oh he's doing the best stuff you should check it out. And then you might find some of his stuff on his website but you only find that out in your networks... So you have to know someone or you don't have access to that... (Participant 2)

First there's intelligence, which is having and knowing plenty of people who will give you information and being able to react to that intelligence very quickly if needed... Intelligence is knowing what's what and being able to take advantage of that (Participant 5)

In the next quotes, a further emphasis is placed on accessing knowledge, including skills, as a usable resource for their self-development and simultaneously, the development of others ('the team around me'). Information for developmental purposes is only accessible through ECAs knowing people, and people knowing them as ECAs.

I think it's not necessarily about the information or content but more about accessing skills or knowledge... I use the knowledge of others in the network not only to develop myself but to develop the team around me... (Participant 3)

I think that the main form is through the network of people that you know already, because what happens in that is, if they would think or I would think there is something relevant coming up for our development or other research, teaching or servicing I would touch base with my fellows or peers. I think that is ultimately the most important and the most relevant way in which I get access to information and in a way it's also how I can keep track of my development, my learning. (Participant 10)

There's the human network that know the sort of person I am, the sort of things I'm interested in and can piece it together when they come across something and I'll do the same for them... (Participant 1)

The last two quotes suggest that knowledge is created through relating to information. 'Relating' in this sense means having the ability to know what's relevant or valuable for theirs or another person's development. Thus, the main

process associated with using information to learn while building developmental networks is 'relating to information to create knowledge':

> Early career academics must be able to relate to the information before they can learn. The relationships between people make the learning and knowledge meaningful (Participant 1).

Once the learner can relate to information, knowledge is created. Once knowledge is created, the learner interacts with the knowledge through the next two processes of **Knowing Self** and **Knowing Others**. The process of Knowing Self involves identifying, testing, feeling, discovering, reflecting on and offering knowledge of self. The process of Knowing Others involves accessing, monitoring, aligning, seeking, applying and sharing knowledge of, and with other people*.* The three interactions occur concurrently towards building relationships and networks for development.

Building Mutually Supportive Relationships

To build on this notion of human relationships, in response to either of the open ended questions posed, each participant suggested and discussed the idea of 'reciprocity' as being critical to successful creation and maintenance of developmental relationships and networks. Such reciprocal relationships are conceptualised as being mutually supportive, in that they provide benefits in the forms of information, learning and support to the ECAs and those people who act as their mentors or 'developers'. A developer in this study refers to someone who does not act as a mentor but still has a significant impact on an ECA's learning, such as a colleague, a friend or relative. Data analysis involved the construction of a variety of ways in which ECAs use information to learn while building mutually beneficial relationships and networks. While the main process of informed learning, 'relating to information to create knowledge', was discussed in the previous section, three sub-processes or ways of relating to information to create knowledge were identified which enable reciprocal interactions between

ECAs and their developers, these are *knowing self, knowing others* and *recognising layers of relationships.*

Knowing Self

Knowledge of one's own beliefs, preferences, experience, expertise, skills, capacities and needs, in a holistic sense, is key to establishing and maintaining developmental relationships. Developing an awareness of and learning about oneself as a source of information and knowledge can enhance the quality of the relationships within the network. The focus here is on how the ECA informs the development of a network or relationship, as the following quote conveys:

> …you've really got to get a sense, when accessing a network, of not only what I can get from the network but what can I bring to it… they're always very generous but I think it appropriate to actually have a sense of what you are bringing to it as opposed to what you can get out of it, if you expect them to cooperate with you for very long. And so that sense of reciprocity. (Participant 2).

Self-knowledge can also inform ECAs' decisions about which relationships/networks are most suitable and most effective for their own development. For example, participants discussed service activities both within and outside the university context, such as volunteering to participate in academic committees, reviewing government policy documents or advising about educational technology use and sharing this knowledge:

> …when someone needs a hand you step in to help as much as you can and by going on committees and meetings… because then you're giving back… so that reciprocity is key (Participant 1).

So initially I think it starts off as a one way street where you are actually building that network···to access a particular piece of information··· but eventually as an academic that has to turn back around··· the educational technologist now contacts me about a particular educational technology because I've had more experience with that than they have··· it was a case of me setting up the project and working out what I need to do and disseminating it to other people so they're building their networks. (Participant 3).

These activities allow the ECA to offer their self-knowledge for the benefit of others, as a way of building and strengthening networks for developing their teaching and research. The following six activities emerging from the data presented in Table 3 begin to illustrate the process of how ECAs interact with their self-knowledge to learn while networking.

Identifying Self-knowledge	The first step in the process of learning in the self-knowledge context, involves ECAs' *identifying critical information from personal experience towards forming an academic focus or niche.*
Testing Self-knowledge	This activity involves ECAs' *testing out and evaluating a variety of information for personal relevance or suitability for developmental purposes.*
Feeling Self-knowledge	Interacting with emotional aspects of personal knowledge involves *feeling particular emotional states that inform ECAs development.*

Discovering Self-knowledge	This activity relates to ECAs' *discovering self-knowledge to arrive at certain realisations or understanding of oneself.*
Reflecting Self-knowledge	The activity of *reflecting involves interacting with rational and emotional aspects of personal and experiential knowledge through deliberate introspection.*
Offering Self-knowledge	The activity of offering self-knowledge involves *contributing all types of knowledge to build a relationship with a developer or potential developer.*

Table 3: How ECAs interact with their self-knowledge to learn while networking

Knowing Others

At the same time, learning while building networks is informed by their knowledge or their perception of others. In terms of creating broader networks, one participant describes this experience as:

> I know everyone who works in my area, I know who they are and I make an effort to interact with them and help them and give them information… so there's that kind of broader intelligence of knowing what's going on··· that means people think of you when they're thinking about who would we put on this committee or we need an advisory panel and who would you ask? (Participant 5).

Similarly, in an effective mentoring relationship, knowing how a mentee benefits a mentor helps to build reciprocity:

Mentoring is a two-way thing and often it's about someone senior recognising that someone has the ability to make money for you or to help you. And I guess even now I look at people and think this person could actually be quite good so it's worth me spending money to take them to a meeting because I can see some advantage in it (Participant 5).

In this way, the reciprocal nature of the developmental relationship enhances the perceived quality of learning while building networks. The following six processes emerging from the data presented in Table 4, begin to illustrate how ECAs interact with the knowledge of others to learn while networking.

Accessing Knowledge of Others	This activity involves *knowing how to access various types of knowledge from developers or potential developers within their network.*
Monitoring Knowledge of Others	The activity of monitoring involves *ECAs maintaining an awareness of other people's personal, disciplinary and interdisciplinary knowledge to learn their roles.*
Aligning with Knowledge of Others	The activity of aligning involves *ECAs joining and adapting to existing and new developmental networks.*

Seeking Knowledge of Others	This activity involves *ECAs seeking out other people's knowledge to inform their development.*
Applying Knowledge of Others	This activity involves *ECAs applying and demonstrating what they have learned from other people in their networks.*
Sharing Knowledge of Others	This activity involves ECAs sharing all types of knowledge to build networks. This differs from the offering of self-knowledge. Sharing knowledge with others also involves sharing knowledge gained from others and knowing the overall impact if it is shared.

Table 4: How ECAs interact with the knowledge of others to learn while networking.

Recognising Layers of Relationships

Data from the interviews indicate that the developmental relationships are comprised of several layers. This 'layering' phenomenon is potentially significant for increasing understanding of how information is used to learn through these 'developmental relationships'. Several layers have been identified and these can be divided into five categories of 'relationship layers' as outlined in Table 5 below.

Relationship layer	Type
Communication modes	Face-to-face, in person only
	Face-to-face, online (video) only
	Virtual only (non-face to face)
	Blend of face-to-face, in person and virtual, long distance

Cross-boundaries	Cross-disciplinary
	Cross-profession
	Cross-cultural
	Cross-institution
Work roles	Research only
	Teaching and Learning only
	Administrative only
	Overlap of Research/Teaching/
	Administration
	Academic-practitioner
	Service
Personal sphere	Intellectual
	Emotional
	Physical
	Spiritual
	Creative
Temporality	Stages / Timing / History / Journey (of a developmental relationship or network)

Table 5: Relationship layers that inform ECAs' learning while developmental networking

Informal Sphere of Learning

In this research, learning for ECAs is experienced as formal, informal and non-formal. To define each of these, formal learning types are structured, scheduled and are sometimes compulsory including formally recognized courses of study, formal mentoring and professional development programs, university plans and policies and formal meetings such as performance reviews. Non-formal learning types occur as part of structured formal learning, such as face-to-face informal discussions held in relation to a formal class or an online

short course message board. Informal learning types are unstructured and more spontaneous in nature, including self-directed learning, incidental learning, informal mentoring, social media, physical informal discussion and distributed informal discussion.

While each participant in this study discusses formal, non-formal and informal interaction, the recurring pattern from the data is clearly on the use of information and creation of knowledge from informal interaction as being most important for learning. The 'Informal Sphere' represents a way of conceptualizing the collective forms of informal learning, knowledge and information located within an ECA's knowledge ecosystem. The Informal Sphere is a key concept in this research, as it provides a 'mental space' for understanding how ECAs experience informal learning and interaction between knowledge and information located within an ECA's knowledge ecosystem. The Informal Sphere also includes informal interactions around learning types in the non-formal and formal spheres.

Knowledge Ecosystem Model

The 'Knowledge Ecosystem' is a holistic approach to conceptualising ECAs' developmental experience, encompassing resources that inform learning and the experience of using these resources to learn. The ecological approach (as described by knowledge management researchers such as Chatti (2012)) captures ECAs' descriptions of their experiences with building developmental networks for two main reasons: 1) while information is a critical resource for learning in this context, ECAs' learning is primarily informed by knowledge resources created through dynamic interactions with a variety of information resources and 2) the concept of a knowledge ecosystem in this context features interdependent human and non-human components such as information, knowledge, interactions, informal learning and developmental relationships and networking for ECA career progression. The knowledge ecosystem (Figure 1) consists of three key elements: **Resources** (Knowledge Resources and

Information Resources), **Interactions** (Relating to Information to Create Knowledge) and **Learning** (Informal Sphere of Learning). The whole knowledge ecosystem model represents informed learning, as depicted in Figure 1, and can be viewed through either one of two 'lenses': **Inner Focus** and **Outer Focus**. These lenses represent different ways of experiencing informed learning.
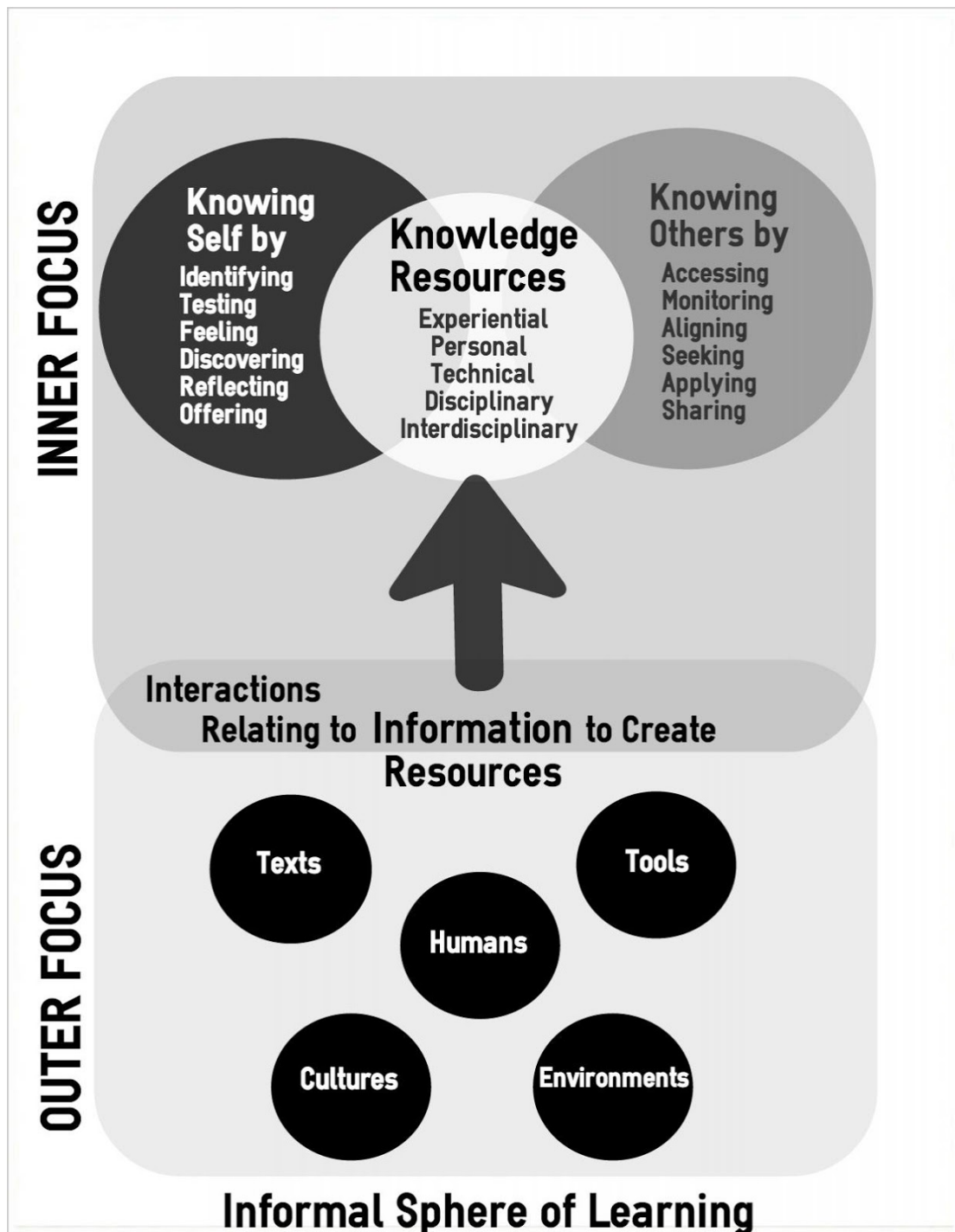

Figure 1: *Knowledge Ecosystem of ECAs Building Developmental Networks*

The model in Figure 1 shows that while building their developmental networks, early career academics' learning is informed by knowledge and information resources. Knowledge resources are created from three main interactions: the ECA relating to information resources; knowing self; and knowing others with associated sub-interactions listed below. These interactions occur within the Informal Sphere, which encompasses informal types of learning, information and knowledge. The Inner Focus concentrates on learning by interacting with knowledge resources within human-to-human relationships, while the Outer Focus highlights learning by interacting with information resources outside of human-to-human relationships.

Inner Focus and Outer Focus

While the three main elements are fused together in the diagram, there are two lenses from which the entire knowledge ecosystem model can be viewed and understood. These are labelled the 'Inner Focus' and the 'Outer Focus'. In both the Inner and Outer Focus, the main interaction of relating to information to create knowledge (through knowing self and knowing others) is applicable. Inner Focus highlights ECAs relating to information to create knowledge resources *within* human relationships in a developmental network. In Figure 1, Inner Focus draws attention to intangible knowledge and learning types that can only occur inside human-to-human relationships. Inner Focus is also strongly associated with information, knowledge and learning in the Informal Sphere.

Outer Focus highlights processes of ECAs relating to a broader range of information resources, both tangible and intangible, located *outside* of human relationships in a developmental network. Outer Focus encompasses information sources from text, tools, humans, culture and environment and how these sources can inform learning. Information can be located within any of the formal, non-formal and informal spheres. The interplay between Inner and Outer Focus involves ECAs relating to information sources and creating knowledge within

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human relationships to use for learning various tasks associated with their academic roles. While Outer Focus is important for understanding the holistic knowledge ecosystem, the view is secondary to Inner Focus as ECAs' interactions are more strongly emphasised in the data for the Inner Focus experience.

Inner Focus: Learning Informed by Knowledge Resources Within Relationships

This experience places a focus on the knowledge generated from interaction within one or more relationships in a developmental network. This is an Inner Focus, illustrated in Figure 2, which concentrates on the relationships themselves as knowledge contexts or entities. The following quote encapsulates the Inner Focus experience:

> What informs me is the relationships that I have, the development of those relationships and how they grow over time (Participant 9).

Relating To Information To Create

Knowing Self — Knowing Others

Changing Over Time
Balancing Roles
Navigating Across Boundaries
Exploring Personal Dimensions
Selecting Communication Modes

Self-Knowledge — Knowledge of Others

Identifying
Testing
Feeling
Discovering
Reflecting
Offering

Accessing
Monitoring
Aligning
Seeking
Applying
Sharing

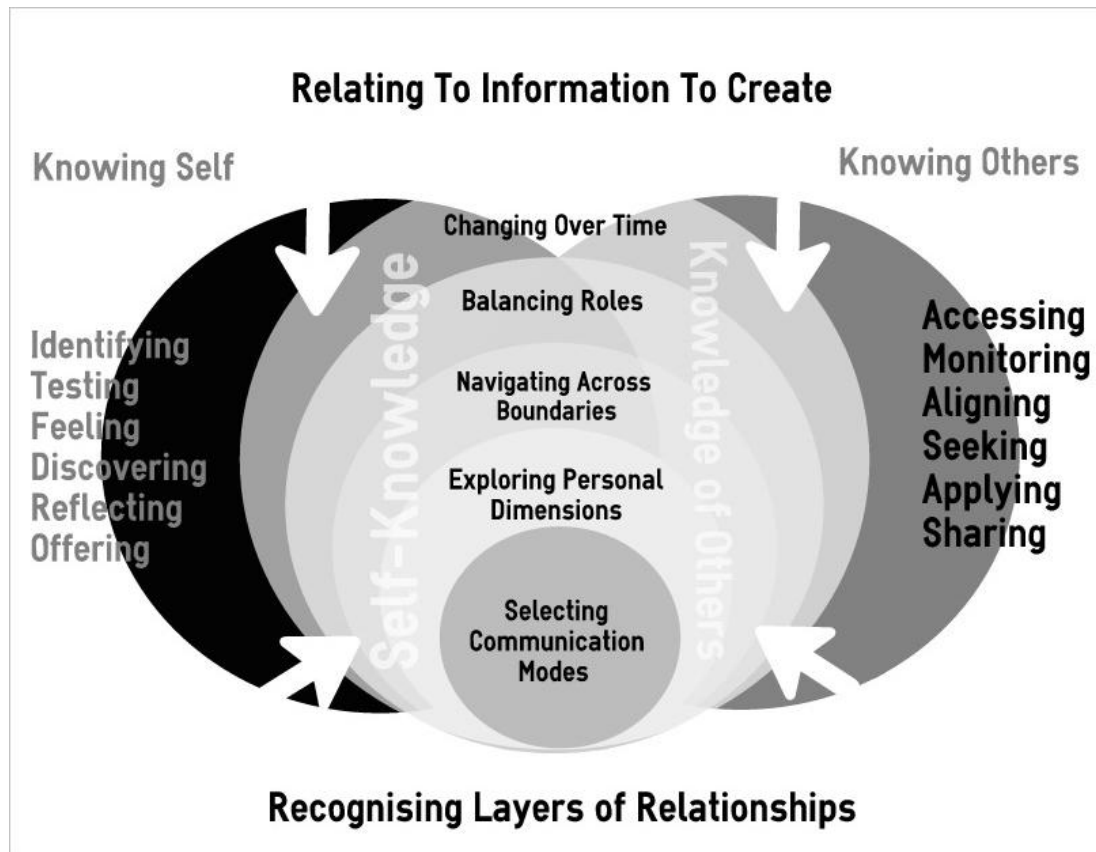**Recognising Layers of Relationships**

Figure 2: *Inner Focus: ECA's Learning Informed by Knowledge Resources Within Relationships*

Outer Focus: Learning Informed by Information Resources Outside of Relationships

While the Inner Focus highlights the entities of human-to-human relationships as informing learning, the Outer Focus experience acknowledges the wider range of resources within a knowledge ecosystem used by ECAs while developmental networking as illustrated in Figure 1. The Outer Focus broadly encompasses contexts and factors influencing and shaping the relationships and their development. In the Outer Focus, ECAs' learning is informed by:

···anything that you receive through your senses that enables you to improve, enables you to do something at a better capacity than you had previously done... So it can be anything, it can be someone demonstrating something to you, it can be text on a page or a screen, it can be an anecdote, it can be a story someone tells you, it can be a full on lecture, it can be you being told off, like this is wrong, you know. It encompasses all of those things···. to me, that's what a network is, it's not just people, it's texts you read, it's articles you read, it's blogs, podcasts, it's everything.' (Participant 6).

Relating to Information to Create Knowledge

The Outer Focus highlights information resources (texts, tools and human individuals) and contextual information (environments and cultures). The ECA relates to these resources outside of human-to-human relationships through a multisensory experience to create knowledge to inform their learning, and are recognized as part of their developmental networks.

Relating to Texts to Create Knowledge

This mainly involves seeking people to contact using a wide range of textual sources such as print and online (i.e. articles, books, databases and expert directories).

It also involves seeking theory from academic, peer-reviewed publications to support the development of teaching and research portfolios to identify theories that can relate to their specific experiences. This information can enhance their learning about self-concept as related to various facets of their academic roles.

Accessing these texts from databases or networks requires knowledge of searching techniques, both technical and interpersonal.

Monitoring print and online media for 'who's who' and 'who's doing what' is also commonly practised. Some participants share these findings with others using online social media or during informal meetings and discussions with colleagues and team members.

Relating to Tools to Create Knowledge

This mainly involves testing a variety of technologies (i.e. hardware and software, landline telephones, PCs, wireless tablets or mobile devices) for developmental networking purposes. How these technologies are used informs ECAs' learning by influencing their experiences (either positive or negative). Technologies are evaluated through ongoing testing for task-specific and personal suitability, monitoring for updates, aligning and sharing through working collaboratively on common platforms, accessing through funding and communicating with relevant technical experts.

Relating to Humans to Create Knowledge

This involves initial seeking, monitoring and accessing information from a range of individual people who are located outside of their established developmental networks. ECAs relate to information from previously unknown humans usually at the very beginning of relationship formation, to be potentially followed by knowledge creation as the ECAs engage in the interactions of knowing others.

Relating to Cultures to Create Knowledge

Participants in this study discuss several forms of 'culture' that they perceive as they learn their roles. Again, these are perceived as either positive or negative.

These include a culture of research or enthusiasm about intellectual activities, a culture of sharing information and knowledge both internally and externally.

Relating to Environments to Create Knowledge

This involves monitoring the physical environment such as building infrastructure, geographic location, design of workspace and ambience or atmosphere. It also involves broader political and governmental climates.

Theoretical implications

The value of this contribution is a holistic and unified model, which identifies the main elements of ECAs' knowledge ecosystem containing informing entities which ECAs interact with to learn. The model can be used to inform design of university or workplace-based experiences such as professional development programs, events, courses and experiences external to the university such as social media, community and the home. Some of the ways in which the key learning experiences from this study are enriched by identifying interactions with knowledge and information resources, include:

- hearing from experienced leaders as 'role models' at professional development programs,
- seeking and attracting developers (informal mentors or peers) while taking formal courses,
- presenting papers at events such as conferences, thus gaining peer feedback and making friends,
- getting known through volunteering within professional communities and internal committees,
- maintaining personal foundations around the home, family, and social life, and
- seeking or attracting new opportunities for expansion using a range of social media.

This study indicates the use of, or interaction with informal information and knowledge resources, needs much closer attention. Literature on learning informally in higher education is focused on information sharing while social networking (Totterman & Widen-Wulff, 2007), however information use for learning and professional development is a different context and the use of information to enhance quality of learning needs further research.

One of the main issues raised in the ECA development literature is the need to support the development of agency, or the capacity to act in a certain way, for new professionals, particularly a balance of individual and relational agencies and the need for ECAs to recognise when different forms of agency should be exercised (Sutherland & Petersen, 2010). In this study, the knowledge ecosystem contains the key interactions of knowing self, knowing others and recognising layers of relationships. The identification of these processes and interactions works towards our understanding of how ECAs use information to learn, and also learning by the balancing of individual agency, through knowing self and developing self-concept, professional identity and self-efficacy by interacting with self-knowledge, and relational agency, through knowing others and how they collaborate by interacting with the knowledge of other people. Interactions grouped under recognising layers of relationships add value to our understanding of relational agency, highlighting various dimensions of relationships, which can inform learning. While relational agency has come to the forefront of the current discussion in this research area, this study suggests that both forms of agency are critical to ECAs' empowerment for learning and development, and ultimately for experiencing success in their roles. From these findings, it can therefore be suggested that successful development of individual and relational agencies can be achieved by facilitating informed learning experiences for ECAs.

Three main findings from the current literature on developmental networks have particular salience for this study. These are that developmental networks (in general):

- consist of multiple mentors for helping people grow and develop in a variety of areas relevant to their jobs (Crocitto et al, 2005; Higgins & Kram, 2001; Molly, 2005);
- are successfully built and experienced through mutually supportive relationships (Dobrow et al, 2012); and
- involve quality interactions for learning (Baker Sweitzer, 2009).

Findings from this study clearly reflect these current trends, with this study making a specific contribution to our understanding the experience of developmental networking in academia. Mentors, especially informal, self-selected mentors, are identified in this study as key developers and key knowledge resources within an ECAs' developmental network. Research supervisors and senior academic leaders such as Heads of School, Deans and highly experienced members of the Professoriate, are also identified as key knowledge resources, and accessing their experiential knowledge is regarded as very important for ECA development. Developmental networking experiences in the academic context, suggests that the design of higher education support systems needs to better facilitate multiple relationships with key developers to improve access to specific types of knowledge needed to learn and perform their jobs successfully.

Recent reviews of developmental networking as a general human resource development strategy highlight the importance of the 'mutuality perspective' (Dobrow et al, 2012). Findings from this current study of ECAs reflect the reciprocal nature of successful contemporary developmental relationships. Mutually supportive relationships comprised of ECAs' self-knowledge, knowledge of others and various relationship layers as identified in Table 1, can be linked to research into early career practitioners, particularly the concepts of 'relational' and 'individual' agencies (Edwards & D'arcy, 2004; Hopwood & Sutherland, 2009; Warhurst, 2008). As participants each discuss both working collaboratively and independently, according to their learning needs and situations, this study suggests that a combination and/or balance of relational

(knowledge of others) and individual (self-knowledge) informs learning and growth.

Quality interaction for learning, in the context of this study, refers to ECAs' interactions with personal knowledge (including affective knowledge such as trust, empathy and social savvy) and the experiences of recognising layers of relationships, particularly selecting communication modes. This finding is supported by the concept of 'high quality connections' (Heaphy & Dutton, 2006). Among other findings, research into building 'high quality connections' has revealed that these types of relationships enable effective information and knowledge exchange or sharing (Heaphy & Dutton, 2006). These areas are relevant to this study, in terms of extending the theoretical and practical implications and providing a more holistic, balanced view of the experiences of ECAs practices.

In general, Experience Design strategies and principles to facilitate informal interactions through relationships of mutual benefit are needed. Academic developers (for teaching, research, career), mentors (formal and informal), ECAs and information and knowledge managers within higher education, need to collaborate to provide enriching learning experiences within the informal sphere. This could involve providing opportunities and support for informal interaction and informal information use, both online and offline, to develop personalised developmental networks towards quality learning experiences for ECAs and their successful development of 'relational' and 'individual' agencies.

This study adds to our understanding of what it means to experience informed learning in the informal sphere consisting of a combination of informal learning in both structured and unstructured environments and relationships, and informal interactions with information and knowledge resources. In this study, an informed learner is understood to be someone who interacts with a wide range of resources that reach beyond formal sources of information (such as a

traditional teacher-led classroom setting) into the informal sphere of learning to experience self-directed learning (deliberate and autonomous), incidental learning (non-deliberate or spontaneous) or non-formal learning (informal learning within formal spaces).

From the findings, we can see how these non-traditional forms of learning influence how people use and experience information to learn. Compared to research on formal learning experiences, there is little research focussing on informal learning experiences from information literacy, behaviour and practice perspectives. While the concept of informed learning has emerged and evolved from the formal learning environment, the theory also seeks to be used to understand and improve quality of learning within information practices in a variety of contexts outside of formal education, such as workplace, community and social life, where informed learning could contribute to our understanding of learning in informal environments. This study has provided some emerging insight into what informed learning looks like in a professional practice (academic) context, which spans across university and non-university contexts and spaces.

Conclusion and Future Research Recommendations

This study illustrates the interdependence of each of the elements in the knowledge ecosystem: the people, relationships, informal learning interactions and other forms of information and knowledge that are informing learning. By conceptualising the system in this way, it makes clear the need for strong interactions between each of these key elements. This study has focused on the perspectives of ECAs only, while an ecological view would encompass the perspectives of all involved in the ECAs ecosystem such as their developers. In future studies, the perspectives of ECA developers could provide further insight to consolidate the knowledge ecosystem model developed in this study. It is also suggested that future studies explore ways in which experiential and behavioural

theorists and practitioners in information and academic development can work together to develop deeper understanding of the ECA learning experience.

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