

# Identification of Role Models in Online Communities of Practice

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**Abstract.** Lifelong learning introduces a new challenge for learners: the self-directed choice of learning goals and learning paths. The research literature indicates the presence of role models as a positive influence on career choices and as an aid in the choice of learning paths. However, finding a role model is not a trivial task. In this paper we present a Ph.D. proposal that addresses the challenges raised by the automatic identification of role models in online communities of practice.

**Keywords:** Role Models · Communities of Practice · Expert Search

## 1 Introduction

Lifelong learning encompasses all forms of on-going learning and has been seen as a key driver for economic growth at European level [3, 6]. However, lifelong learning presents challenges which differs from classical education. Whereas in formal education, learning paths are developed by education specialists via specific course curricula, in lifelong learning learners are often self-directed, choosing their own learning goals and building their own learning paths [4].

In different domains of practice, role models have been identified as sources of inspiration for the attainment of goals as well as exemplars for the pursue of vicarious learning (i.e. learning through imitation) [7]. In the context of lifelong learning, identifying a role model has the potential to: (i) support the choice of learning goals by identifying a source of inspiration; (ii) increase the learners motivation towards a learning goal by demonstrating that a given learning goal is achievable; and (iii) support the construction of a learning path by proposing a behavioural model. However, the search for a role model is not a trivial task and is highly dependent on a learners personal circumstances (e.g. finding someone in a local community, having access to a local group).

Online communities of practice can help in the search for role models by removing the distance barrier. In these communities, learners engage with members to share learning material, activities and strategies related to a given domain. Within communities of practice, access to potential role models is higher, but the challenge of finding a suitable role model within an ever increasing number of members remains.

The remainder of this document outlines a Ph.D. proposal that aims at exploring the problem of *automatic identification of suitable role models for specific learners in online communities of practice*. Such proposal is based on the assumptions that: (i) role models aid lifelong learning, an argument presented in Section 2; and that (ii) learners want to identify role models online, what is supported by the existence of follower-influencer mechanisms present in modern online social networks.

## 2 Role Models

Role models are “individuals who influence role aspirants achievements, motivation, and goals by acting as behavioral models, representations of the possible, and/or inspirations”, according to the Motivational Theory of Role Models (MTRM) developed by Thekla Morgenroth [7]. In order to characterise role models within the lifelong learning domain we need to explore the three functions described in the MTRM separately.

***Role models as behavioural model*** are individuals who support a learner by providing a demonstration on how to achieve a specific learning goal. For lifelong learners, who need to choose their own learning paths, these are individuals who provide a demonstration of a path that brings the learner from where he or she currently is to the achievement of the learner’s goal. According to the MTRM, role model as behavioural model “includes not only the modeling of behavior, but also cognitive and emotional strategies that may enhance goal attainment.” [7]. In other words, it includes also the sharing of learning strategies to achieve a learning goal.

***Role models as demonstration of possible*** are individuals who represent future opportunities or prospects, thus proposing that a given learning goal is attainable. In such function, role models do not show how to achieve a learning goal but demonstrate that a learning goal is achievable. For lifelong learning, they may improve learner’s motivation towards a given goal. Morgenroth et al. suggest that “observing a role model having achieved a particular goal may, under the right circumstances, be enough to motivate role aspirants to believe that they too can reach that goal. (...)” [7]. The MTRM suggests that shared social identities may enable the function of role models as representations of the possible.

***Role models as inspiration*** are individuals who serve as exemplar of success on a given domain of interest for the learner. As a consequence, lifelong learners are inspired to set new learning goals that lead them to be more similar to their role models. In the learning domain, this function of role models can be achieved by a high level of competency on a domain of relevance to the learner.

### 3 Communities of Practice

‘Communities of practice’ is a term coined by Jean Lave and Etienne Wenger and it refers to communities which “are formed by people who engage in a process of collective learning in a shared domain of human endeavour” [10]. For a group to be considered a community of practice it needs to present three main characteristics: (i) a shared domain of interest; (ii) the development of relationships between members, through sharing information and engaging in joint activities and discussions; and (iii) a shared practice, i.e. a shared repertoire of experiences.

There are also two additional characteristics that help distinguishing between communities of practice and other online learning communities. First, in a community of practice there are no fixed roles of provider of experience (e.g. teacher, mentor, coach) and learner. Instead, all members switch between learner and mentor roles depending on their current activity. Second, communities of practice have a strong interest in the exchange of experiences, stories and personal strategies for goal attainment [10], rather than just focusing on formal learning materials and learning activities.

### 4 Problem Statement

Considering the background provided above, the problem addressed by this PhD can be formulated as “How to identify, within a community of practice, role models that are suitable for a given learner?” Taking into account the characteristics of role models for lifelong learning and the characteristics of communities of practice, any solution to the specified problem needs to be able to successfully:

- Identify the learning goals targeted and achieved by all members in the community of practice (*goal modelling*).
- Profile a member in the community of practice in terms of his or her: pursued learning paths, available learning strategies, relevant social identities and competency levels in the achieved goals (*learner profiling*).
- Align the learner’s goal with the profile of members to determine potential role models (*peer recommendation*).

### 5 Related Work

Role models are types of peers, and the identification and recommendation of peers is not a new task. In this section we present our preliminary analysis of the literature in the areas of Expert Search and Technology-Enhanced Learning (TEL).

The identification of role models, as outlined by our problem statement, relies on the recommendation of peers based on four types of attributes: learning paths, learning strategies, social identities, and competency levels. Despite the availability of work in Expert Search and peer recommendation in the TEL

domain, in this preliminary analysis we were not able to identify any work that focuses on identification of role models or that uses the four types of attributes defined by the problem.

The literature in Expert Search has focused on the recommendation of experts, i.e. peers with maximum competency levels on a given topic of interest (see [2] for an overview). In the TEL domain, Labeke et al. [9] present a system for lifelong learners to search for peers with similar learning paths and shared social identities. While their approach allow learners to identify people with similar paths, this work does not make use of learning goals and it does not take into account how similar learning paths are resolved.

Also in TEL domain, Beham et al. [1] recommend knowledgeable people on a topic related to a learner's current goal in a workplace environment. Their definition of knowledgeable people is similar to an expert about which only the competency levels are considered. Furthermore, the authors assume the organisation will have a predefined domain model with all goals to be pursued, whereas in a community of practice it is expected that the goals and learning paths are continuously generated and modified by the members of the community.

## 6 Research Questions

The main research question to be explored within this Ph.D. is the following:

*"What is the contribution of learning goals, social identities, learning strategies and competency levels for the identification of role models in online communities of practice?"*

This research question will be further divided into the following questions:

- *RQ1.* How do lifelong learners choose and describe their own learning goals?
- *RQ2.* How to profile lifelong learning progress towards goal within communities of practice?
- *RQ3.* How do lifelong learners find and engage with suitable role models in communities of practice?
- *RQ4.* What is the most suitable computational platform to support the identification of role models in online communities of practice?

## 7 Methodology

This research will follow a Design Science Research methodology [8] that comprises of the following steps: problem definition, characterisation of solution, design and development, demonstration, evaluation, and communication.

In this PhD research, we will start with a pilot study within the higher education setting (i.e. circa 15 members of internal workshops and study groups around writing or presentation skills) and expand first to a larger group, then to another community of practice in a related domain (e.g. well-known Twitter communities such as AcWri, PhDChat, or ECRchat).

During the problem definition stage, RQ1, RQ2 and RQ3 will be explored via interviews and focus groups. Then, in the stage for characterisation of the solution, the elements required to answer RQ4 will be specified. In the design and development stage, MTRM and Communities of Practice theory will be applied together with other relevant theories to inform the design of a role model recommendation system. After continuous engagement with participants to gather feedback on the design of visual elements in the demonstration stage, the efficacy of the developed platform will be measured through user-based evaluations (e.g. think aloud interviews, questionnaires) and its efficiency will be evaluated by benchmarking against related state-of-the-art algorithms.

The research knowledge and artefacts generated by each iteration of this study will be communicated in major research conferences and journals.

## 8 Approach

Our approach to the problem of identification of role models in communities of practice is divided into three elements: goal modelling, learner profiling and peer recommendation. Each element refers to a requirement provided by the problem statement as outlined in Section 4 and is also related to at least one Research Question. Note that this work is still in a proposal stage, therefore we do not have preliminary results on the application of this approach.

**Goal Modelling** aims at describing learners' goals so that they can be matched with goals accomplished by role models. Our approach aims at creating a seed domain model with learning outcomes (i.e. write a book, or write a Doctoral Consortium paper) as possible goals for the domain and allow the members of the community of practice to change the domain model over time. Our approach aims at considering steps in learning paths as sub-goals towards a final outcome. The main challenge in this approach will be the integration of diverse learning paths into a single domain model. The development of the goal modelling component relates to RQ1.

**Learner Profiling** is related to RQ2 and aims at describing the characteristics of learners in communities of practice. For that we will explore the construction of profiles based on social identities (e.g. gender, ethnicity, profession, age), learning strategies (e.g. usual time of study, use of learning resources), and measured competency levels by competency achieved in having followed a learning path as well as by how many times a goal has been attained (e.g. an author of 50 peer-reviewed academic papers would have higher competency in writing academic papers than another author with only 2 papers). Note that this step also covers the profiling of potential role models by considering they are also learners in the community.

**Peer Recommendation** is where role models get identified and recommended to a learner. In order to implement this component (and answer RQ3 and RQ4)

we aim at exploring the different architectures proposed by works in Expert Search [2] and Recommender Systems [5].

## 9 Conclusion

This paper presents a PhD research proposal focused on the problem of automatic identification of role models in online communities of practice. The research questions to be explored in this research lead to the following intended contributions: (i) A better understanding on how lifelong learners currently choose and describe their learning paths and goals; (ii) An understanding of how role models are perceived by learners and which strategies learners currently use to find them; and (iii) The development of a computational platform to support the discovery of role models based on goals, competencies, learning strategies and shared social identity.

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