# Research Cluster Workshop
# User Adaptive Systems

**May 13, 2022**

**1:30 – 3:30pm MST**

Click here to join the meeting

Introduction (1:30 – 1:35pm)

Keynote talk (1:40 – 2:30pm)

> **Learner implicit modeling based on educational games: The cases of Working Memory Capacity and personality**
> Prof. Fathi Essalmi, University of Kairouan, Tunisia

Student talk (2:30 – 3:00pm)

> **An investigation on the impact of optimal grouping and regrouping on learners' performance and communicative skills in online collaborative learning**
> Soheila Garshasbi, PhD student, University of Wollongong, Australia

Discussion Session – Professors' announcements and idea sharing (3:00 – 3:10pm)

> **Announcement of NSERC Graduate Scholarship (GSM)**
> Prof. Sabine Graf, Athabasca University

Discussion Session – Students' corner (3:10 – 3:30pm)

> **How to choose a topic for your MSc thesis, project, essay or undergraduate project?**
> Prof. Sabine Graf, Athabasca University

**We look forward to your attendance!**

**If you would like to join this cluster, please send an email to Prof. Sabine Graf at sabineg@athabascau.ca**

# Keynote Talk

## Learner implicit modeling based on educational games: the cases of working memory capacity and personality

**Presenter: Prof. Fathi Essalmi, University of Kairouan, Tunisia**

**Abstract**

Several methods are used to gather information (e.g., based on questionnaire) about learners in order to model them. These methods can be classified into two categories, namely explicit and implicit. In the first category, the collection of information is done in a direct and obvious way (i.e., the learners already know that the instructor is assessing and collecting information about them). In particular, when using questionnaires, the learner may select the answer or statement that best describes his/her qualities or characteristics (Essalmi et al, 2017). However, individuals can have low self-knowledge, which may not allow them to answer the questionnaire correctly (McDonald, 2008). Besides, questionnaires are typically too long and can make individuals stressed and unmotivated. Moreover, questionnaires may not be the best method to ask people about themselves, since people try to respond in a fashion that they perceive as being more acceptable, when they feel they are assessed by others (Okada and Oltmanns, 2009). In the second category, the collection of information is done in an indirect way (i.e., the process of collecting information is done in the background and the learner is unaware of this activity). In this case, information is collected from the learners' traces in e-learning environments. These traces can be the time spent interacting with the learning content or the number of clicks. However, most e-learning systems may present the learning content in a passive form (i.e., only few clicks) which can generate inaccurate learners' traces. Consequently, someone may ask if the learners really read the displayed learning content or not. Educational games, on the other hand, are highly interactive, present the learning content in a very interactive way and keep learners motivated (Pablo et al., 2009; Prensky, 2005). This allows using the generated traces during the learning-playing process to model and assess learners.

This presentation focuses on two cases of learner implicit modeling based on educational games: (1) modeling the learner's Working Memory Capacity and (2) modeling the learner's personality.

Concerning the the working memory, it is the system that holds and processes information in the brain for brief periods of time (Baddeley, 1986; Baddeley and Hitch, 1974). Gathercole and Alloway (2008) highlighted that working memory plays a critical role in the learning process. In addition, several studies showed that learners' different levels of Working Memory Capacity (WMC) can affect their learning performances (Alloway and Alloway, 2010; Woehrle and Magliano, 2012). Several studies have also investigated the relations between WMC and different aspects, such as reading comprehension, comparison speed, fan effect, navigational pattern and attention control (Lin, 2007; Carretti et al., 2009). For example, Lin (2007) mentioned that learners with low WMC have poor reading comprehension, low comparison speed, greater fan effect, non-linear navigational pattern and poor attentional control. Contrariwise, learners with high WMC have good reading comprehension, high comparison speed, lesser fan effect, linear navigational pattern and better attentional control. Having information about learners' WMC could be helpful to support them during the learning process (Khenissi et al, 2017). For example, by providing learners personalized suggestions, appropriate materials and meaningful recommendations to

support their low and high WMC. Chang et al. (2014) suggested to present an adaptive recommendation in learning system that encourage the students with low WMC to rethink or remember the key or important content after they have learnt a learning object. In fact, students with limited working memory are likely to forget the key information after a brief period of time. Once the adaptive recommendation is presented, the student could either chose to remain in the content of the current learning object or proceed to the next object.

Concerning the learner personality, various research work have reported its importance in learning environments. For example, Arockiam and Charles (2013) highlighted the importance of taking into consideration the learner's personality while designing e-learning interfaces. El Bachari et al. (2010) recommended taking into consideration the learner's personality while assigning to him/her a learning approach. Vasileva-Stojanovska et al. (2015), Caspi et al. (2006) and Pawlowska et al. (2014) demonstrated a correlation between respectively the learner's personality and his/her learning outcomes, academic performances and satisfaction. Patrick (2011) stated that learners' evaluation of teaching methods can be affected by the instructor's personality. In this context, the second objective of this presentation is to study the traces that can be retreived from the learning/playing process (in educational games) to model the learner's personality. In particular, we focus on the extraversion and introversion personalities. The terms "introversion" and "extraversion" go back to the 1921s and to the psychologist Carl Jung. He considered introversion as people who move their energy toward their inner world of feelings and ideas, while, he considered extraversion as people who move their energy toward the external world of people and activities (Jung and Baynes, 1921). Costa and McCrae (1992) identified 6 facets of extrovert persons which are as follows:

- Warmth: They are friendly and like others by showing warmth and affection.
- Excitement seeking: They get bored easily and seek excitement and action.
- Activity: They are energetic, full of life and like movement.
- Assertiveness: They are self-confident and usually the leaders of their groups.
- Gregariousness: They do not like being alone and prefer the company of others.
- Positive emotions: They are full of positive feelings.

**Short Bio**

Fathi Essalmi is a PhD in computer science since 2011. He has more than 70 scientific papers in the domain of learner modeling and e-learning personalization. Furthermore, he supervised international students in the research master degree and in their PhD thesis. Dr. Fathi has obtained the habilitation degree to direct research in 2017. In addition, he has 15 years of academic experience.