

# Group Immersion in Classrooms: A Framework for an Intelligent Group-Based Tutoring System of Multiple Learners

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**Abstract.** This paper presents a short introduction into an Intelligent Classroom Tutoring System, which seeks to extend the classical individual based Intelligent Tutoring System into a Multilevel Tutoring System.

**Keywords:** Group Based Intelligent Tutoring Systems · Multi Level Group Analysis

## 1 Intelligent Classroom Tutoring System

### 1.1 Introduction

The Intelligent Classroom Tutoring System (ICTS) model is an attempt to extend the Intelligent Tutoring System (ITS) model from a single learner to a group of learners. The aim is to take the current traditional physical classroom and use that environment to assist a human teacher in delivering knowledge to the learner. The model is split into two components, the individual ITS component, which is the existing ITS model, and a group component. The feedback loops within the traditional ITS and this ICTS model, which is where the learner, individually and/or as part of a group, is instructed through a series of teaching techniques transferring the domain knowledge via a communication interface and updating the learner model.

### 1.2 New Components Outlined

**First, Second and Third Teacher** The ICTS utilises the terminology of the Reggio Emilia approach [1] where the environment in which the education takes place is named the Third Teacher. This environment as teacher is used to inspire and direct learners through the use of external stimuli[1]. Within the ICTS Framework the Third Teacher is the AI that manipulates the environment, the group user interface, adjusting the environment to the emotional state of the room, but also defining the narrative of the lesson via the Group User Interface. The First Teacher is the classroom teacher and the Second Teacher is the ITS AI for individual learners.

**Group Model** The Group Model is an attempt to capture and manipulate Group Cognition (GC). GC is different from Individual Cognition (IC). While GC is dependant on IC, a higher level of argumentative structure combined with a greater zone of proximal development can be observed within a group than within the IC of members[2]. Each group is unique based on the individuals involved within each group and the strength of group cohesion based on relationships and power structures within that group[3]. Group cohesion is dependant on the creation of group practises, which are adopted or rejected by the GC[4].

**Group Pedagogy** Educational researchers have tended to agree that group learning is superior to individual learning[5]. The direction of the knowledge flow, either from the teacher directly or via self learning and other learners, can be expressed as a continuum, where a teacher transfers the responsibility of generating ideas and knowledge towards the learner [6]. The ICTS Group Pedagogy Module is based on how the First Teacher wishes to construct the lesson, depending on how the groups are formed as part of the Group Model. Emotional and academic profiles of groups and individuals are passed back to the First Teacher during learning sessions. The First Teacher can then decide on how to best act upon that the information they receive.

**Classroom as interface** The premise of the Classroom as a Group User Interface is the idea of an invisible or transitory user interface that allows the transfer of knowledge to a group of learners. This interface is the physical component of the Third Teacher, modifying the environment of a room to either stimulate learning outcomes, act as an intermediary between knowledge and the learner, assist the First Teacher direct learner attention and support the lesson plan.

Future work includes the creation of a group matrix to identify types of groups, and an experiment utilising light as a medium for lesson structure.

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