# Negotiation Driven Learning

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**Abstract.** Negotiation mechanism used in the current implementations of Open Learner Models is mostly positional based and provides minimal support for learners to understand why their beliefs contradict with that of the system. This study aims at proposing a new paradigm of learning that uses negotiation coupled with targeted responses to motivate a learner and enhance their metacognitive skills along with their cognitive skills.

**Keywords:** Negotiation, Metacognition, negotiation-driven learning, inter-est-based negotiation, learner motivation.

## 1 Introduction

In recent years much research has been done in the field of Intelligent Tutoring Systems (ITS) to support and promote independent, self-regulated learning. Open Learner Models (OLMs) aim at enhancing both cognitive and metacognitive skills of a learner through guided content, externalization, scaffolding and negotiation. However, negotiation has been underutilized in the current implementations of OLMs. Negotiating or debating with others allows us to identify alternative perspectives [1]. According to the Constructivist Learning Theory "learning is a process of construction of knowledge through dialogues"[1]. Therefore in this study we propose the paradigm of Negotiation-Driven Learning (NDL) with the aspiration to enhance the role of negotiation as a problem-understanding technique and use it to promote metacognitive activity and enhance learning.
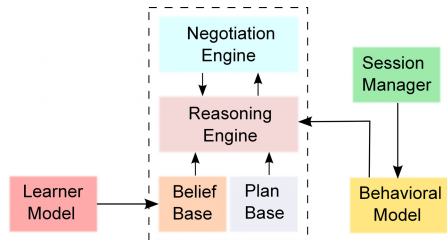
## 2 Background

The negotiation aspect of the current implementations of OLMs is aimed at solving the problem of the conflict between the learner's beliefs and that of the system [2]. OLMs rely upon the externalization of a learner's knowledge to promote metacognitive skills, while negotiation is generally related with the occurrence and resolution of conflict. Position-Based Negotiation (PBN) is employed to resolve these conflicts, however this approach confines the scope of negotiation as more of a "problem solving" technique rather than a "problem understanding" technique [3].

# 3   Negotiation Driven Learning

NDL aims at exploiting the benefits of Interest-Based Negotiation (IBN) [1], which aims at exploring underlying interests of the parties rather than their negotiating positions. IBN plays a vital role in NDL, since in NDL we are concerned with motivating the learner by trying to understand their reason for holding a particular belief, which in turn can help identify why such beliefs are held and how can a learner be persuaded to change them. The proposed system would generate a Behavioral Model (BM) of the learner as they interact with the system. The BM will include information



**Fig. 1.** Proposed Interest-Based Automated Negotiation Agent

about the interactions of the learner with the system; their interest in their respective LM, their enthusiasm in discussing their LM, their help-seeking pattern and their confidence in their abilities. The behavioral model will be continuously updated through the Session Manager (SM) which would record interactions of the learner with the system in real-time. Once the baseline BM of the learner is generated it will be used by the Automated Negotiation Agent (ANA) to understand the motivational state the learner is in and use this information to select the best suited negotiation strategy from the Plan Base (PB) to maximize learning.

# 4   Conclusion

Negotiation provides an excellent opportunity to challenge the learners and promote metacognitive skills by motivating them to think more objectively about their learning. Although the research on NDL is in its early stages, we believe that the paradigm of NDL holds great potential as it opens up new perspectives of learning by using automated IBN to challenge and intrinsically motivate learners through discussions.

# References

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