

# Using Predictive Analytics and Machine Learning Algorithms to Design Immersive Learning Modules for Health Professions Students

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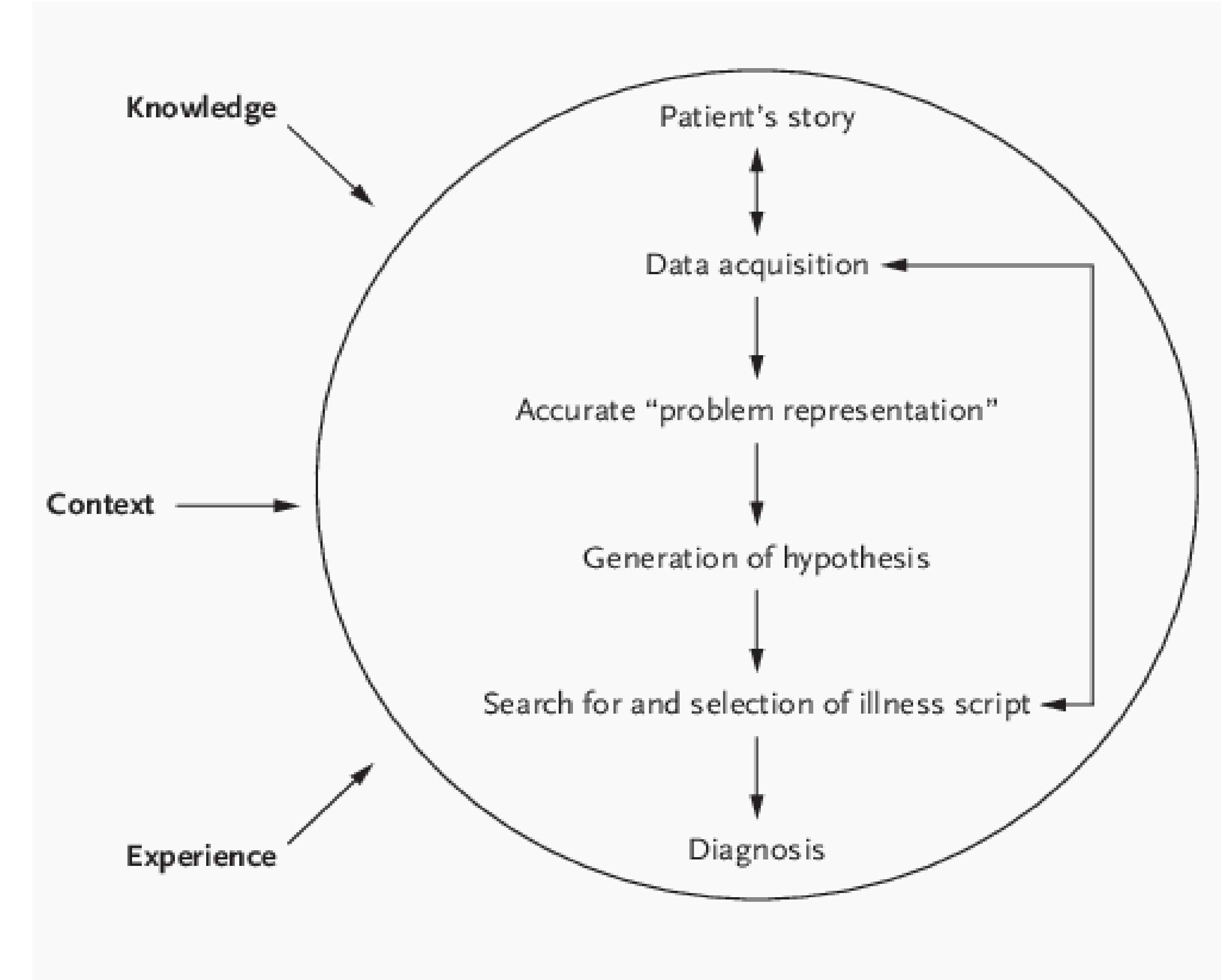
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## Introduction

Pattern recognition is a critical skill health professionals need to conduct effective diagnostic reasoning. Nevertheless, resources and instruction time to teach strategies for pattern recognition to health professions students are limited. Furthermore, students with different learning styles may benefit unequally from a well-designed course with variety of clinical experiences.

The primary goals of this study are to identify the characteristics of health profession students who would benefit from learning pattern recognition via immersive technologies and to identify barriers that may interfere with student learning. The overarching goal of this study is to develop interactive virtual trainings with task-based assessments technology for the understanding of health profession students' approach to symptom recognition using immersive technologies.

Figure 1. Cognitive Reasoning Process for Students of Health Professions



(Bowen, 2006).

Figure 2 and 3. Snapshots of the proposed virtual



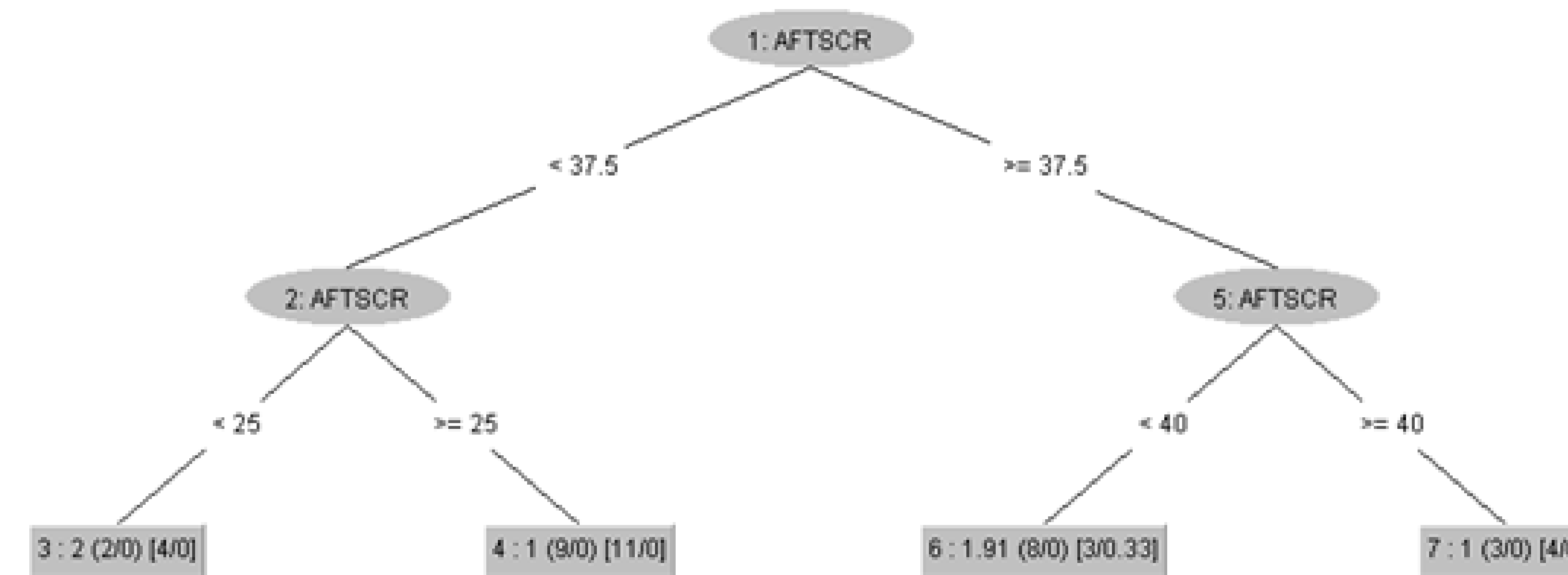
## Methods

Retroactive data were collected from undergraduate and graduate health professions students (n= 52) and were used in the analytics. These data included survey responses from the Presence Questionnaire (Witmer & Singer, 1998) which evaluated students' affinity to technology, their understanding of class delivery changes due to the Covid-19 pandemic, their enjoyment of immersive learning experiences, and their consideration for learning components lost due to the pandemic.

Machine learning techniques using SPSS v 27.0 and Weka decision tree model were employed to classify and predict the receptiveness of learning via immersive learning platforms of health professions students participating in virtual reality (VR)- based learning modules.

Classification trees were constructed and the performance of the generated algorithm was examined using classification accuracy in Weka.

## Results



With the input variables, the generated decision tree demonstrated 61% accuracy in predicting students who are more likely to appreciate immersive technologies for learning based on affinity to technology and ratings of learning components.

### Model specs:

Correlation coefficient	0.611
Mean absolute error	0.252
Root mean squared error	0.386
Relative absolute error	53.16%
Root relative squared error	78.33%

## Discussion & Conclusion

### Limitations

Data utilized in this study were retroactive; furthermore, student participants may have provided responses that have agreement bias.

### Conclusions/Implications for Practice

Machine learning algorithms can be used to customize planned immersive experiences for highest student agreement and learning. Results from this study will help in the identification of health professions student attributes and barriers to learning key diagnostic reasoning skills via immersive technologies.

## Acknowledgement

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