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The Spiral of Teaching and Learning in Astronomy Education

Teaching and learning astronomy is known to be both exciting and challenging. To learn astronomy demands not only disciplinary knowledge, but also ability to discern affordances from disciplinary specific representations used within the discourse, which we call *disciplinary discernment* (Eriksson, Linder, Airey, & Redfors, 2014a) and ability to think spatially, which we refer to as *extrapolating three-dimensionality* from a two dimensional input (Eriksson, Linder, Airey, & Redfors, 2014b). Disciplinary knowledge involves all the knowledge that constitutes the discipline, disciplinary discernment involves discernment of the affordances of disciplinary-specific representations, and extrapolating three-dimensionality involves the ability to visualize in ones mind how a three-dimensional astronomical object may look from a two-dimensional input (image or simulation). In this paper we argue that these abilities are intertwined and to learn astronomy at any level demands becoming fluent in all three abilities. A framework is presented for how these abilities can be described and combined as a new and innovative way to frame teaching and learning in astronomy at university level for optimizing the learning outcome of students - what we refer to as developing the ability of *Reading the Sky* (Eriksson, 2014). We conclude that this is a vital competency needed for learning astronomy and suggest strategies for how to implement this to improve astronomy education.

References

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