Math 313 Van Heile Level Article

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There are 5 levels of geometric maturity students may exhibit. Although this theory and model was developed in the Soviet Union, it was eventually recognized and used by the United States. The five levels are: visualization, analysis, informal deduction, formal deduction, and rigor. According to the Van-Heiles, these steps are sequential and students progress in order. In the visualization stage, students are only aware that space exists but do not know anything else about it. They do not know any characteristics. In the analysis stage, students can see different parts of shapes and begin to state characteristics. They can’t state why those characters exist not show how different attributes relate to each other. The informal deduction stage is when students can now show and identify the relationships of attributes in a shape. They can recognize a shape by the characteristics they have. Students still do not know the significance. They struggle with making proofs. In the formal deduction stage, students realize the significance. They can construct proofs and rules in more than one way. The last level is rigor. In this final stage, students can work in many different axiomatic systems and compare different systems to each other. Geometry is now seen as abstract.

The Van Hieles state that these levels must be reached in order to have a functioning concept of each level that can be used. They must use strategies from previous levels until it replaced by a higher level. They also identified that students need to advance from each level before they proceed to the next. Student’s cannot skip a level and be expected to be successful. In each level past the visualization, students analyze the deductions and theories created in the previous level. Students also need to develop their geometric linguistics as the progress through each level to be able to convey what they know. Lastly, students need their instruction to match the level that each Van Heile level requires. If a level is higher than a student’s instructional level, then they will lose out on several concepts.

Researchers identified that the progress which students make in understanding these levels result on the quality of instruction that is delivered, not necessarily reliant on the ages of students. All instruction needs to promote inquiry, directed orientation, explication, free orientation, and integration of ideas. In addition, students need to have examples and exercises which match each Van Heile level. Students need to see and work on and make reasonings on what is occurring.