

# Fractal methods for ‘scaling up’ ethnographic research

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# Fractal geometry as a tool for understanding complexity

1. Self-similarity
2. Infinite length (extension)
3. Fractional dimension (how quickly does it become complex)

Dimension =  $(\text{Log}N/\text{Log}S)$

N=how many miniatures produced;

S=How many times smaller are the miniatures – magnification factor=1/S

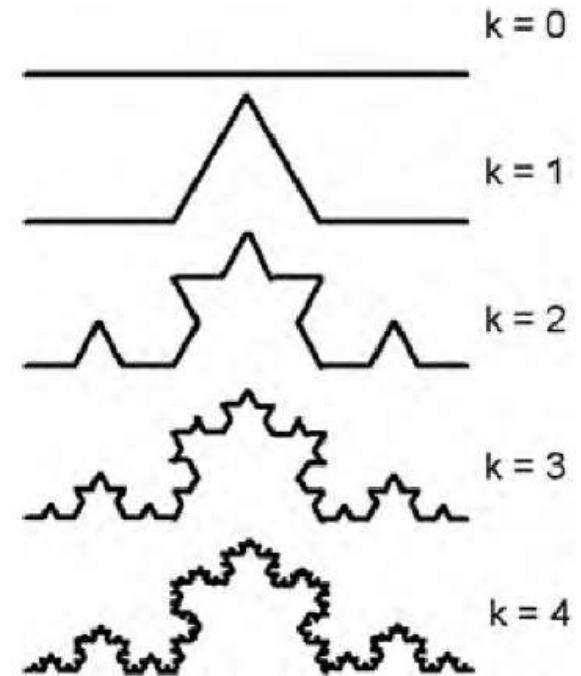


Image Source: <http://what-when-how.com/biomedical-image-analysis/self-similarity-and-the-fractal-dimension-biomedical-image-analysis/>

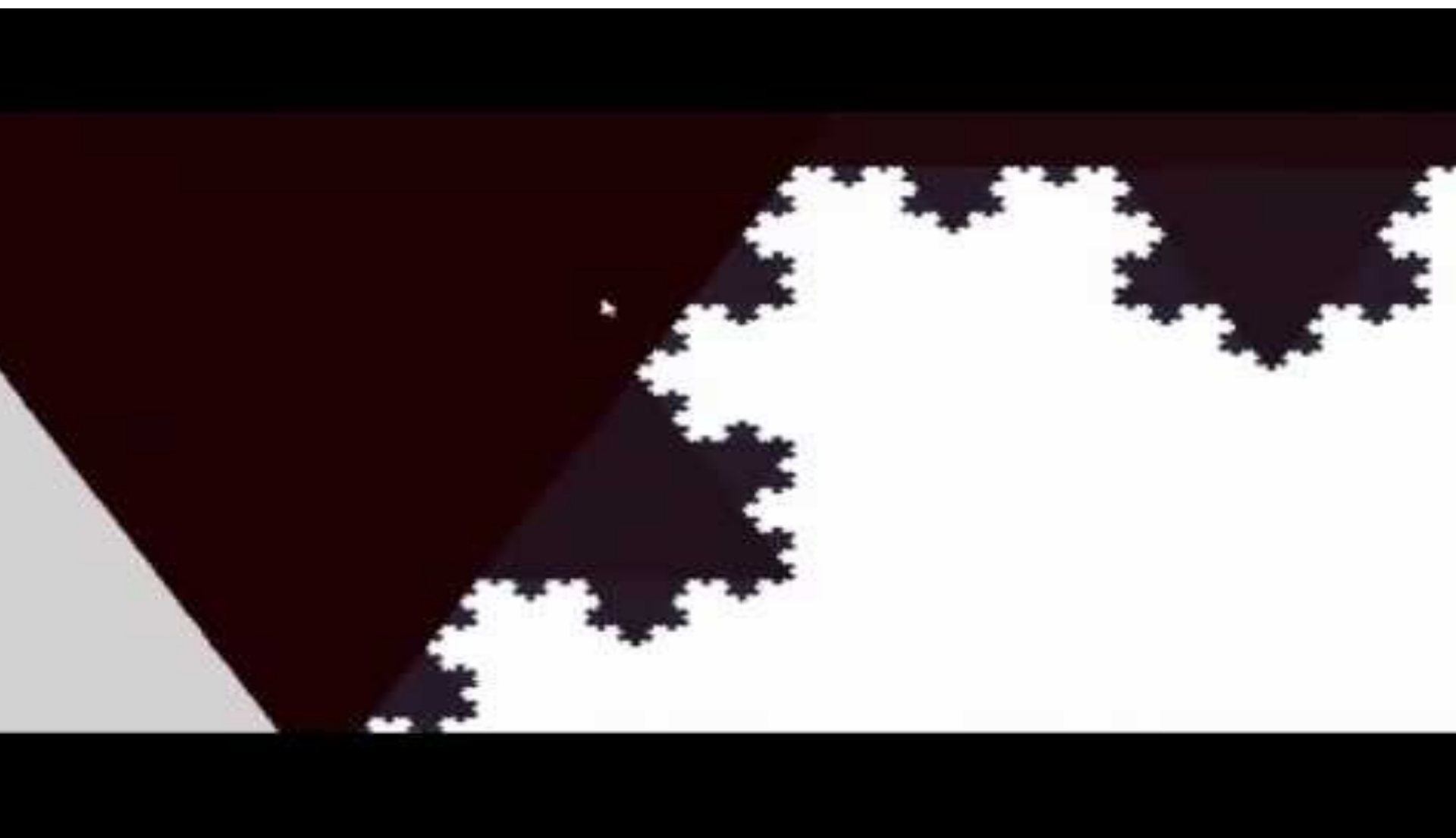
Demonstration of self-similarity: <https://youtu.be/PKbwrzkupaU?t=25s>

Building Koch fractal: <http://www.shodor.org/interactivate/activities/KochSnowflake/>

(dimensions: 1.26)

Building Sierpinski Triangle: <http://www.shodor.org/interactivate/activities/SierpinskiTriangle/>

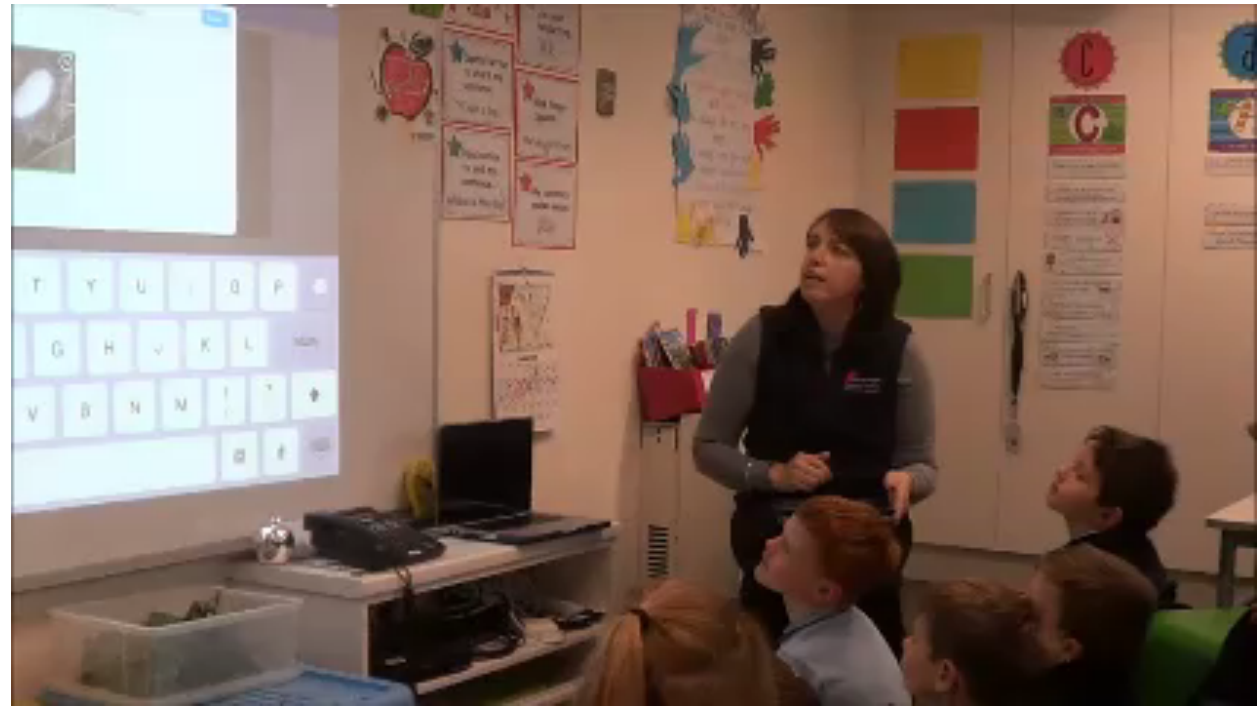
(dimension: 1.58)



# Where to start with a fractal? – classroom view

- Twenty grade 1 students and their teacher in an open-plan classroom in a small rural Victorian school
- Diverse classroom spaces, breakout spaces, various arrangements of tables and chairs, cushions, the mat, the teacher's desk
- White board, Apple TV, projector, iPads, headsets, pencils and felt-tip pens, books, butchers paper, assorted charts, posters, classroom manipulables
- Spoken face-to-face exchanges, hand writing, printed books, picture books, online photographs, online video, student-generated multimedia, teacher-generated multimedia, diverse online channels
- Enquiry task, student choice of topic, student choice of tools and media
- Literacy, numeracy, science, ICT, culture and society, civics, visual art

# Zooming in (self-similarity)



# Taking flight – infinite extension



# Understanding the media complexity of classrooms

- Texture of complexity distribution [self-similarity]
- Scaling up – Looking at what is not in front of us. An alternative way to *looking out* from a microethnographic analysis might be following the flight of the entities of concern (rather than following other cases in search of generalizable features).  
[infinite length]
- Comparing fractals –What might we say about the dimensionality of this classroom session? How quickly does it become complex? Is this a useful question when compare with other classrooms, approaches to teaching and learning, learning activities, learning exchanges? [dimensionality]

# Afterword

- Looking at a fractal vs creating a fractal