Creating Conditions for Participation: Conflicts and Resources in Systems Development

Susanne Bødker

Computational Thinking
Computer Science 6604
Fall, 2013

Chris Frisina

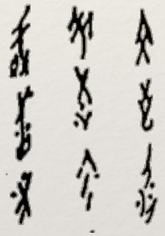
About Me

krĭs tɘʊ fûr spĕ shəl fɹɪ sēn ŭ

chris[topher] special frisina

kris toe fur speh shul frih seen uh

- Undergrad: Female Gendered Communication { UNCC [Charlotte] (49ers) ≠ UNC [Chapel Hill] (tar heels) }
  - Nüshu Script Language "women's writing"
    - Only female created language in the world, for the purpose of women
    - Sung and written, not spoken
    - Taught form grandmother to granddaughter
    - Dead/Dying language unfortunately

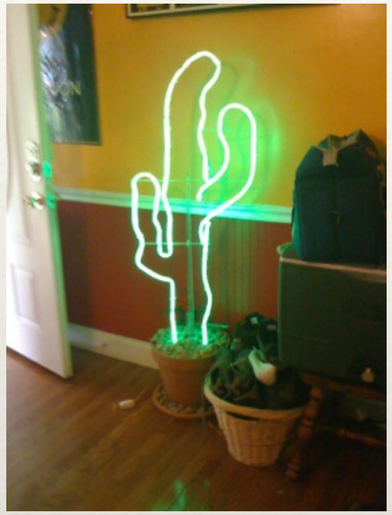


Beside a well one does not thirst, beside a sister one does not despair.

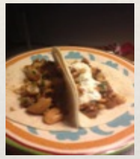
- Industry
  - Harris Teeter [managed the grocery department and inventory management]
  - FedEx Ground [redesigned the package handling process to ensure delivery, in Excel, worked with under-performing managers and tailored training and solutions for them]
- VT Advisor [Deborah Tatar] First year CS PhD Student

Interests

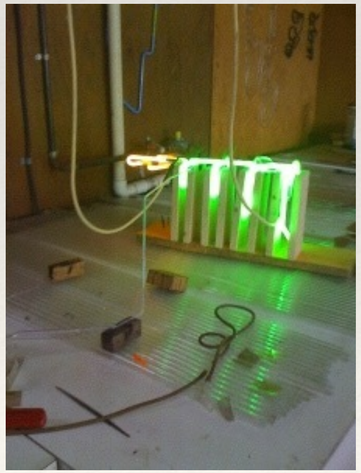
chris[topher] special frisina









My Computational Thinking Definition

CT is an individually constructed, socially and scientifically influenced, way of thinking by defining models and relationships between them; testing the relationships, assumptions, and corner cases; problem identification; and problem solving; with a literate CTer being able to adjust one's scope or position to refine models, clarify and eliminate assumptions, and account for and incorporate corner cases, by participating in structured/creative techniques.

Timeline of Papers

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools
Michael Suffett

2010

Computational Thinking in K–12 : A Review of the State of the Field
Michael Suffett

2-2013

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools
Michael Suffett

2010

Collaborative strategic board games as a site for distributed computational thinking
Panagiotis Apostolellis

4-2011

Computational Thinking in K–12 : A Review of the State of the Field
Michael Suffett

2-2013

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

2006: Computational Thinking Jeannette Wing

2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**

4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**

2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**

10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

- **Pedagogy**
- **Assessment**
- **Learning**

Timeline of Papers

1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**

2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**

2006: Computational Thinking Jeannette Wing

2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**

4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**

2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**

10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

- Pedagogy
- Assessment
- Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **2006: Computational Thinking — Jeannette Wing**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

Pedagogy
Assessment
Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **2006: Computational Thinking — Jeannette Wing**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

Pedagogy
Assessment
Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2002** — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **2006: Computational Thinking — Jeannette Wing**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

Pedagogy
Assessment
Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2002** — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **2006: Computational Thinking — Jeannette Wing**
- **4-2009** — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

Pedagogy
Assessment
Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2002** — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **3-2009** — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- **4-2009** — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **6-2010** — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **2002** — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **3-2009** — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- **4-2009** — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **6-2010** — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

- **Pedagogy**
- **Assessment**
- **Learning**

Timeline of Papers

- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages For Physics Expressive Languages And Algebraic Notation As — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages For Physics Expressive Languages And Algebraic Notation As — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages For Physics Expressive Languages And Algebraic Notation As — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

- Pedagogy
- Assessment
- Learning

Timeline of Papers

- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1987 — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1987 — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 2012 — Understanding Student Computational Thinking with Computational Modeling — **Monika Monk**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1987 — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 2-2007 — Comparison of Student Learning in Challenge-based and Traditional Instruction in Biomedical Engineering — **Hanaa Torkkey**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 2012 — Understanding Student Computational Thinking with Computational Modeling — **Monika Monk**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- **1987** — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- **1999** — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- **2001** — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- **2001** — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- **3-2001** — Recognizing Computational Thinking Patterns — **Ali Anwar**
- **2002** — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- **2003** — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- **11-2005** — Learning Theories and Education: Toward a Decade of Synergy — **Manh Tung Dao**
- **2-2007** — Paving the Way for Computational Thinking — **Michael Stewart**
- **8-2008** — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- **3-2009** — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- **4-2009** — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- **2010** — Comparison of Student Learning in Challenge-based and Traditional Instruction in Biomedical Engineering — **Hanaa Torkkey**
- **2010** — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- **6-2010** — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- **2011** — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- **4-2011** — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- **2012** — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- **2012** — Understanding Student Computational Thinking with Computational Modeling — **Monika Monk**
- **1-2012** — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- **2-2012** — On the Bias — **Dr. Anna Ritz**
- **1-2012** — Introductory Missive — **Dr. Anna Ritz**
- **3-2012** — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- **5-2012** — Please Don't Learn to Code — **Michael Stewart**
- **1-2013** — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- **2-2013** — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- **2-2013** — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- **8-2013** — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- **10-2013** — No--You Don't Need To Learn To Code — **Michael Stewart**
- **10-2013** — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1987 — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 11-2004 — How people learn: brain, mind, experience, and school — **Andre Esakia**
- 11-2005 — Learning Theories and Education: Toward a Decade of Synergy — **Manh Tung Dao**
- 2-2007 — Comparison of Student Learning in Challenge-based and Traditional Instruction in Biomedical Engineering — **Hanaa Torkkey**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-Based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 2012 — Understanding Student Computational Thinking with Computational Modeling — **Monika Monk**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Timeline of Papers

- 1987 — A Buggy Path to the Development of Programming Expertise — **Gaurav Mishra**
- 1996 — Creating Conditions for Participation: Conflicts and Resources in Systems Development — **Chris Frisina**
- 1999 — Learning Through Participatory Simulations: Network-based Design for Systems Learning in Classroom — **Krunal Doshi**
- 2001 — A Comparison Of Programming Languages And Algebraic Notation As Expressive Languages For Physics — **Paul Tranquilli**
- 2001 — Modeling Nature's Emergent Patterns with Multi-agent Language — **Krunal Doshi**
- 3-2001 — Recognizing Computational Thinking Patterns — **Ali Anwar**
- 2002 — Representing Geometric Constructions As Programs: A Brief Exploration — **Mohammad Hasan**
- 2003 — Who Wrote the 15th Book of Oz? An Application of Multivariate Analysis to Authorship Attribution — **Dr. Anna Ritz**
- 11-2004 — How people learn: brain, mind, experience, and school — **Andre Esakia**
- 11-2005 — Learning Theories and Education: Toward a Decade of Synergy — **Manh Tung Dao**
- 2-2007 — Comparison of Student Learning in Challenge-based and Traditional Instruction in Biomedical Engineering — **Hanaa Torkkey**
- 8-2008 — Paving the Way for Computational Thinking — **Michael Stewart**
- 3-2009 — A Multidisciplinary Approach Towards Computational Thinking for Science Majors — **Pejman Khadavi**
- 4-2009 — Developing a Learning Progression for Scientific Modeling: Making Scientific Modeling Accessible and Meaningful for Learners — **Bushra Chowdhury**
- 2010 — Towards the Automatic Recognition of Computational Thinking for Adaptive Visual Language Learning — **Ali Anwar**
- 2010 — Scalable Game Design and the Development of a Checklist for Getting Computational Thinking into Public Schools — **Michael Suffett**
- 6-2010 — A Framework for Computational Thinking across the Curriculum — **Pejman Khadavi**
- 2011 — Was that CT? Assessing Computational Thinking Patterns through Video-based Prompts — **Luna Xu**
- 4-2011 — Collaborative strategic board games as a site for distributed computational thinking — **Panagiotis Apostolellis**
- 2012 — New Frameworks for Studying and Assessing the Development of Computational Thinking — **Shirdhar Chandan**
- 2012 — Understanding Student Computational Thinking with Computational Modeling — **Monika Monk**
- 1-2012 — The Lucas-Penrose Argument about Gödel's Theorem — **Dr. Alexey Onufriev**
- 1-2012 — Introductory Missive — **Dr. Anna Ritz**
- 2-2012 — On the Bias — **Dr. Anna Ritz**
- 5-2012 — Please Don't Learn to Code — **Michael Stewart**
- 3-2012 — The Fairy Performance Assessment: Measuring Computational Thinking in Middle School — **Austin 'Cory' Bart**
- 1-2013 — Constraints on the Universe as a Numerical Simulation — **Dr. Alexey Onufriev**
- 2-2013 — Computing Creativity: Divergence in Computational Thinking — **Ali Anwar**
- 2-2013 — Computational Thinking in K–12 : A Review of the State of the Field — **Michael Suffett**
- 8-2013 — Maybe Not Everybody Should Learn to Code — **Michael Stewart**
- 10-2013 — No--You Don't Need To Learn To Code — **Michael Stewart**
- 10-2013 — A Model Curriculum for K–12 Computer Science: Final Report of the ACM k-12 Task Force Curriculum Committee — **Luke Gusukuma**

2006: Computational Thinking Jeannette Wing

Pedagogy

Assessment

Learning

Structure of the Studies

- Scandinavian Projects (three generations)
  - AT (Copenhagen)
  - Utopia
  - Danish DUE
  - NLIS (took advantage of the VIRK)

Activity Theory

Russian designed:

Alexei Leontiev (Leont'ev)

Sergei Rubinstein

They see human activities as complex, socially situated phenomena

It considers all people and objects in a 'system', as well as history, culture, and motivations of each entity

AT recognizes internal and external process by its members interacting with tools, in addition to the result from the interaction(s)

Participatory Design

Assumptions

- Identification of and access to users
- User's initial and continued interests
- Fights paternalistic choices, encourages democratic and communal input/decision making
- Design, interaction, and implementation only occur while the process/project is running

Observations

- Education is problematic (self efficacy and organized instruction)
- Organizational structure sometime impedes participation

Implementations (current)

- Distributed Participatory design (crowdsourcing)
- Rapid Prototyping
- Q &A sites / forums / portals

Human Development

Grundtvig

Education rooted in own experiences, and discuss it with others

Anti-elitist

Collective growth

Engeström

Borrows a lot from Vygotsky's Cultural-Historical and Leontiev's Activity Theory

Constant artifact [model] reconstruction

Change occurs at different levels and times

Methodological structure

FROM an analysis of the activity

TO a final new instrument into the organization

Zone of proximal development

OUTSIDE of current skill level and cognitive conception, there is a zone within which the person is capable of learning and is motivated to learn.

Human Development

Grundtvig

Education rooted in own experiences, and discuss it with others

Anti-elitist

Engeström

Borrows a lot from Vygotsky's Cultural-Historical and Leontiev's Activity Theory

Constant artifact [model] reconstruction

Change occurs at different levels and times

Methodological structure

FROM an analysis of the activity

TO a final new instrument into the organization

Collective growth ⟷ Zone of proximal development

OUTSIDE of current skill level and cognitive conception, there is a zone within which the person is capable of learning and is motivated to learn.

Organizational Change Management CT

Evaluation

Goals

Innovation

Processes

Observations

Analysis

Feedback / Adaptation

Why do the processes change with scale?

What other attributes effect the design?

Human Development

Grundtvig

Education rooted in own experiences, and discuss it with others

Anti-elitist

Engeström

Borrows a lot from Vygotsky's Cultural-Historical and Leontiev's Activity Theory

Constant artifact [model] reconstruction

Change occurs at different levels and times

Methodological structure

FROM an analysis of the activity

TO a final new instrument into the organization

Collective growth ⟷ Zone of proximal development

OUTSIDE of current skill level and cognitive conception, there is a zone within which the person is capable of learning and is motivated to learn.

Participants / Users

Gr

Group

Scandinavian projects

eXecutive

X

Ma

Manager

Ad

Administrator

Employee

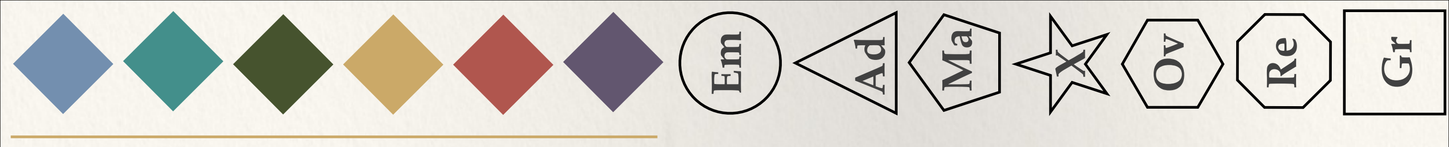
Em

Re

Researcher

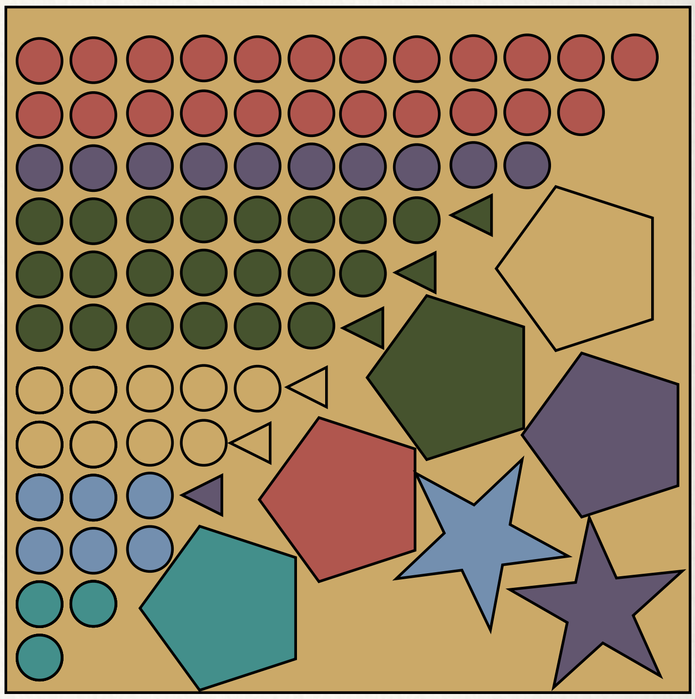
Oversight

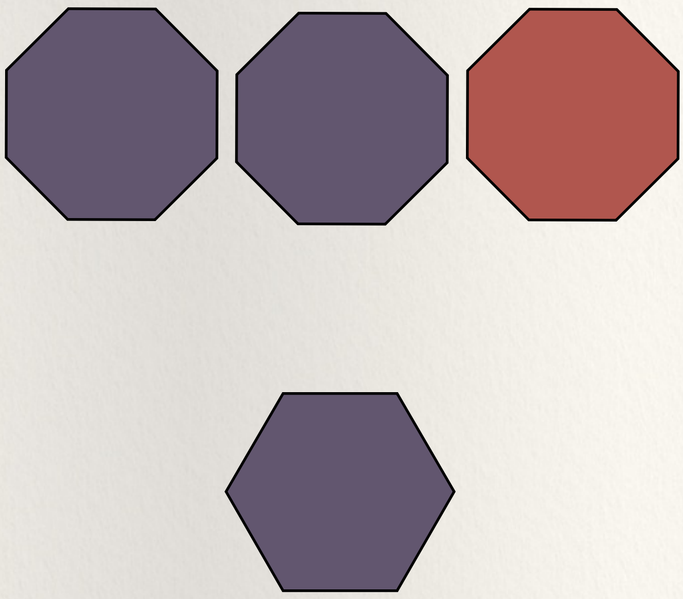
Ov

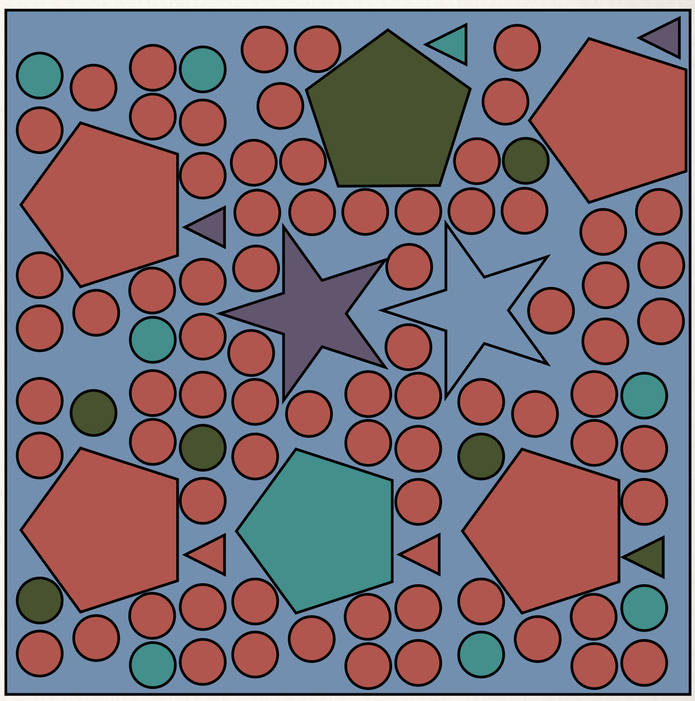


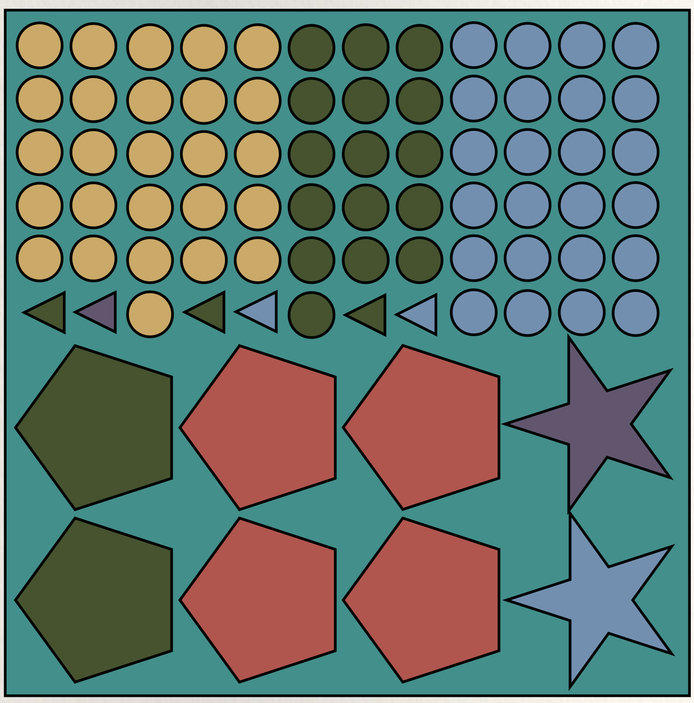
Novice

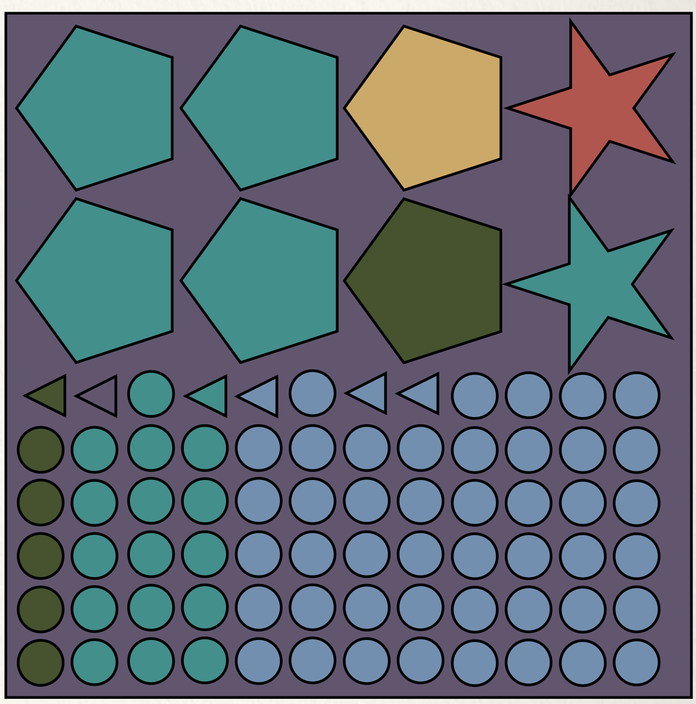
Senior

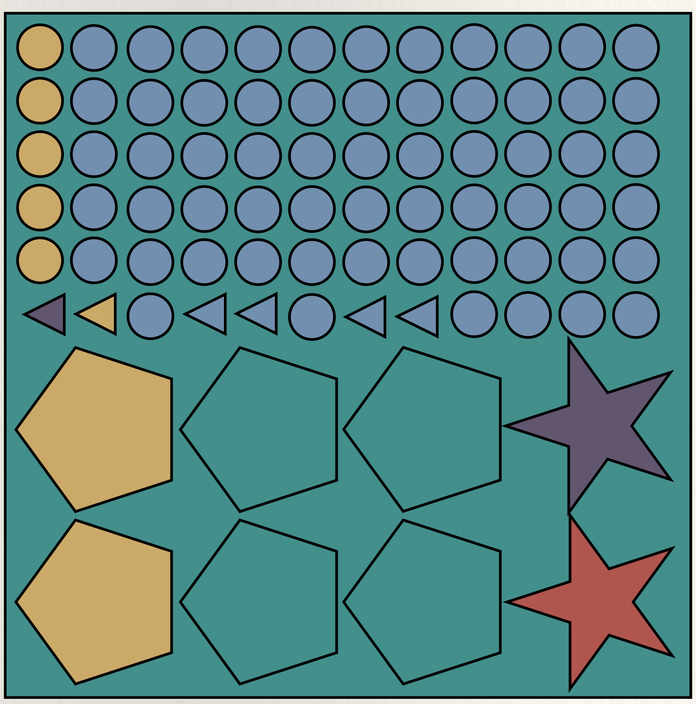


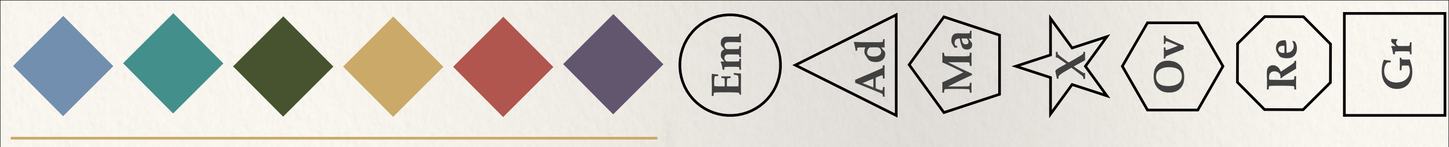






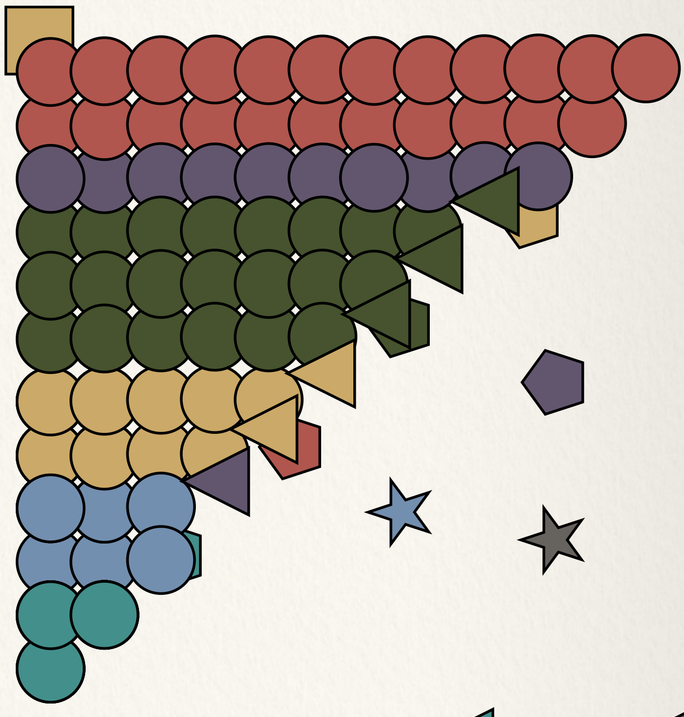


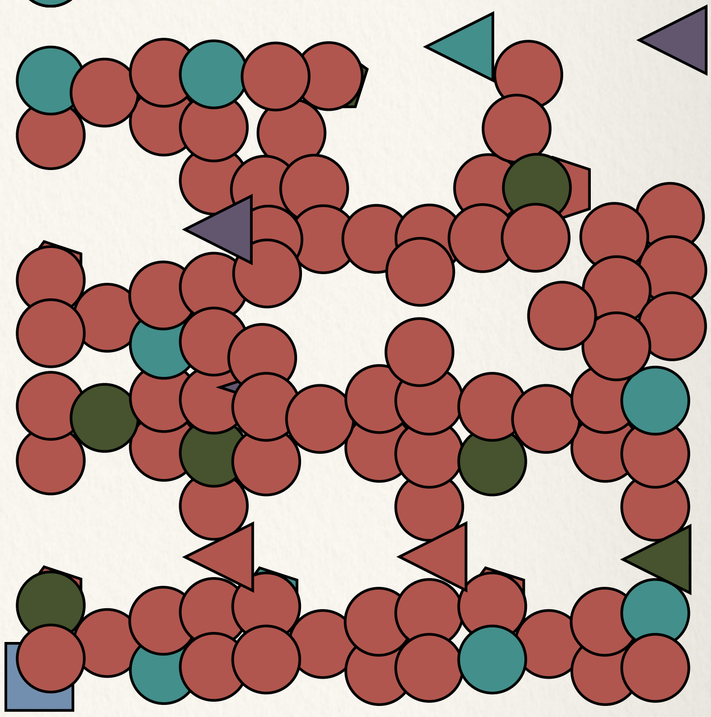


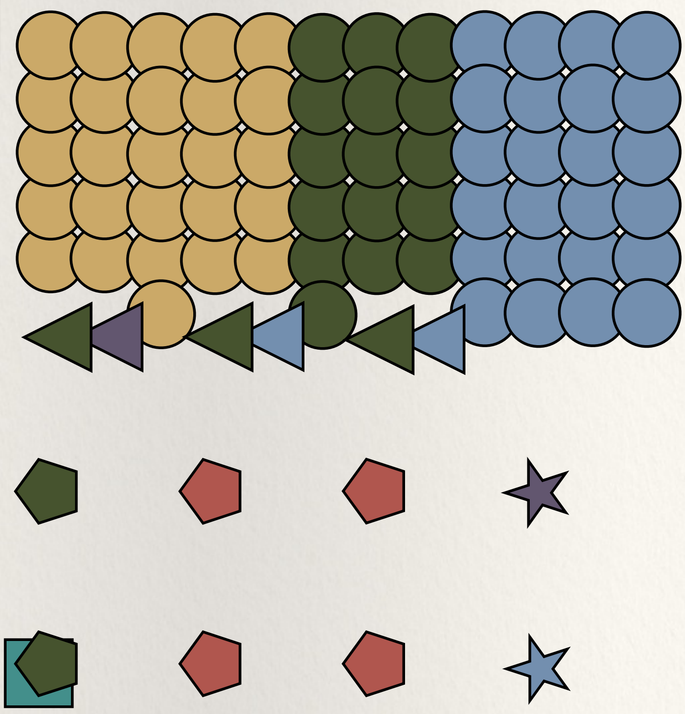


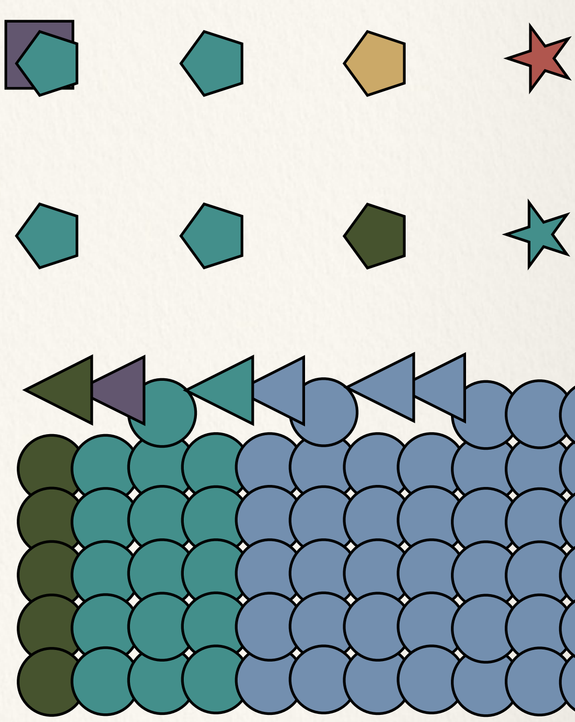
Novice

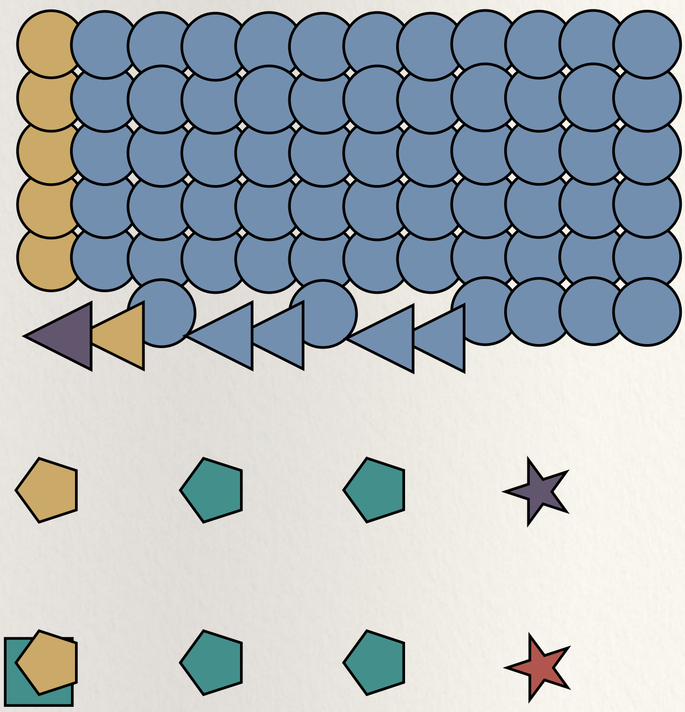
Senior

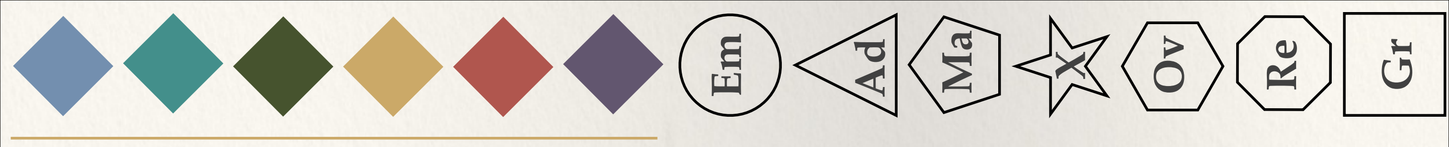




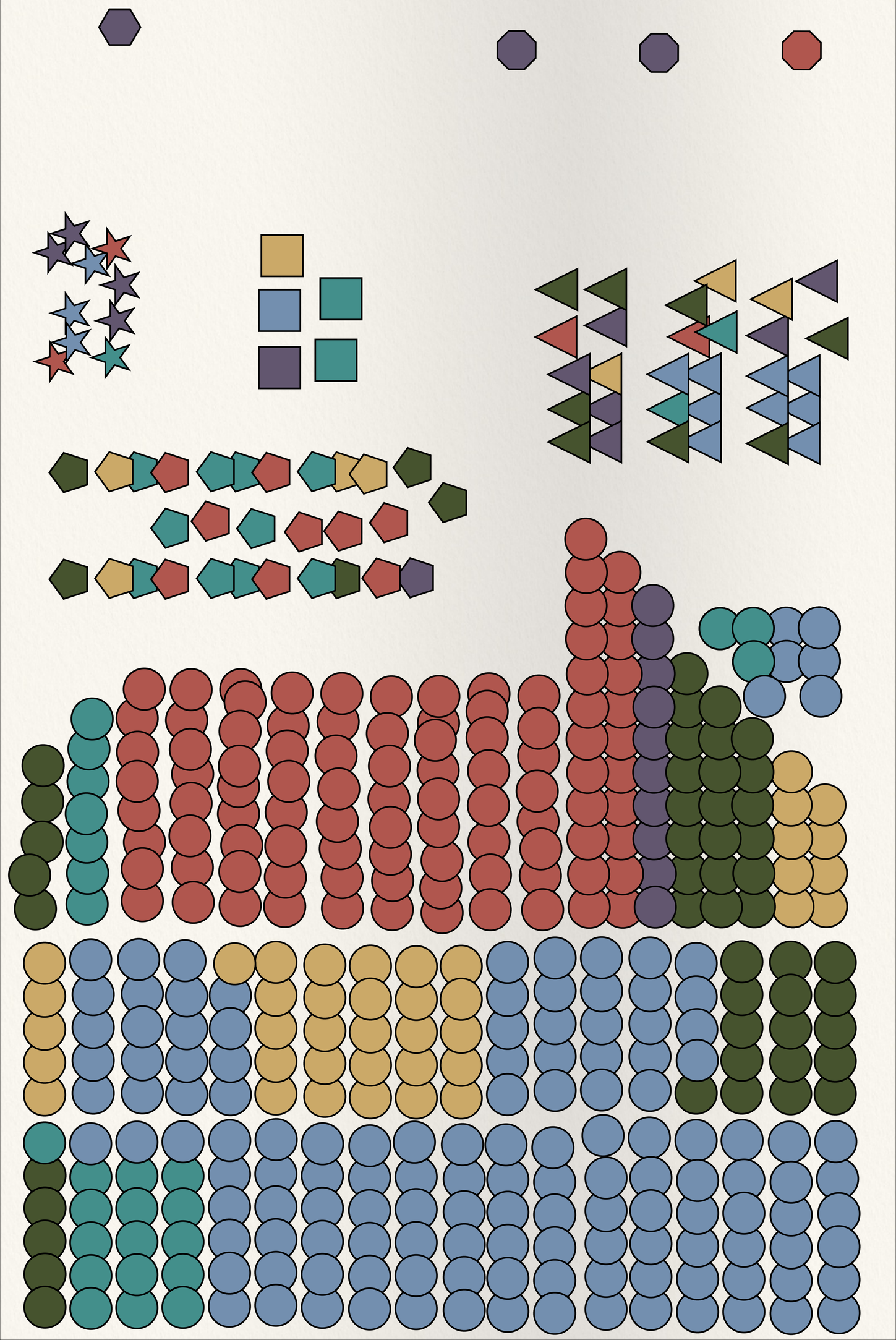




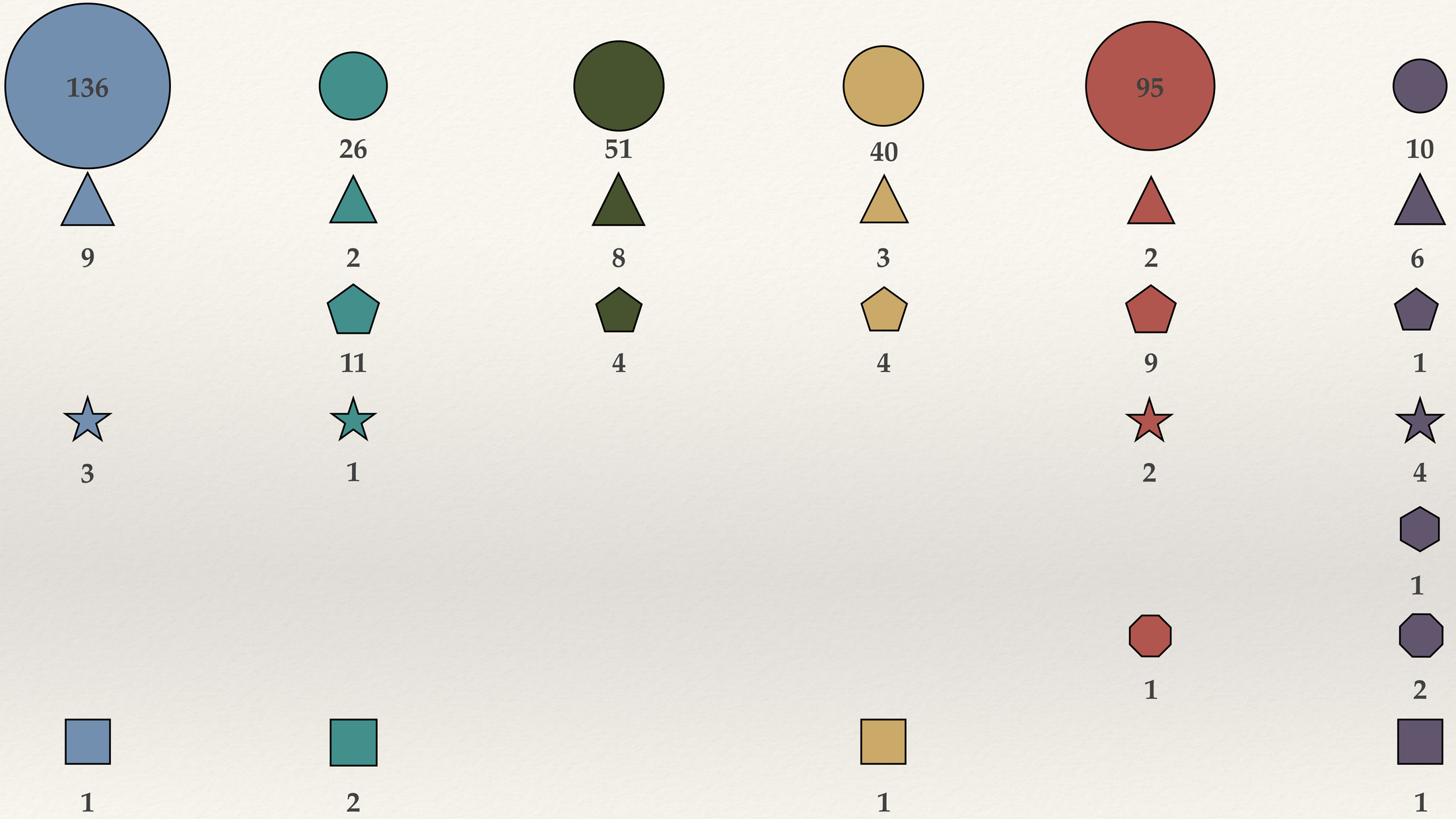




Novice Senior

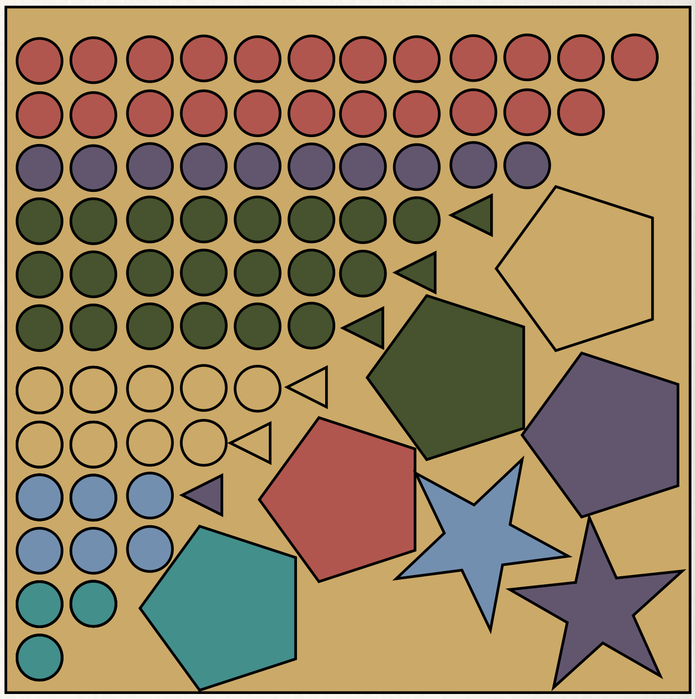


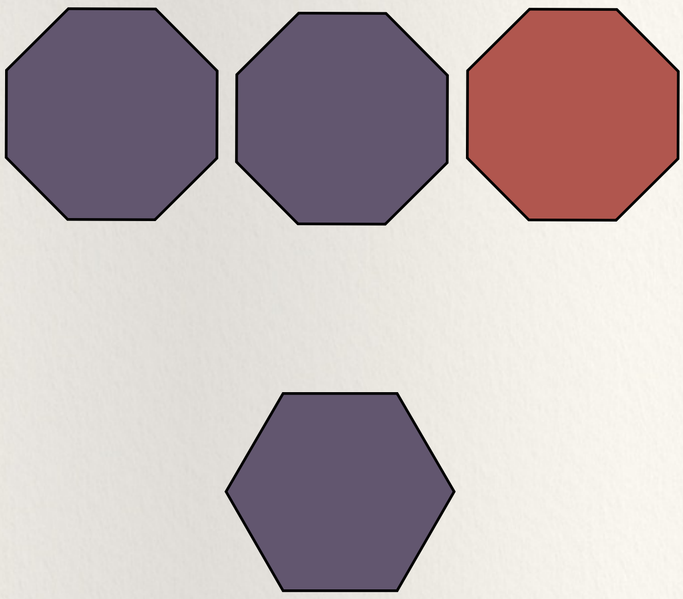
Novice Senior

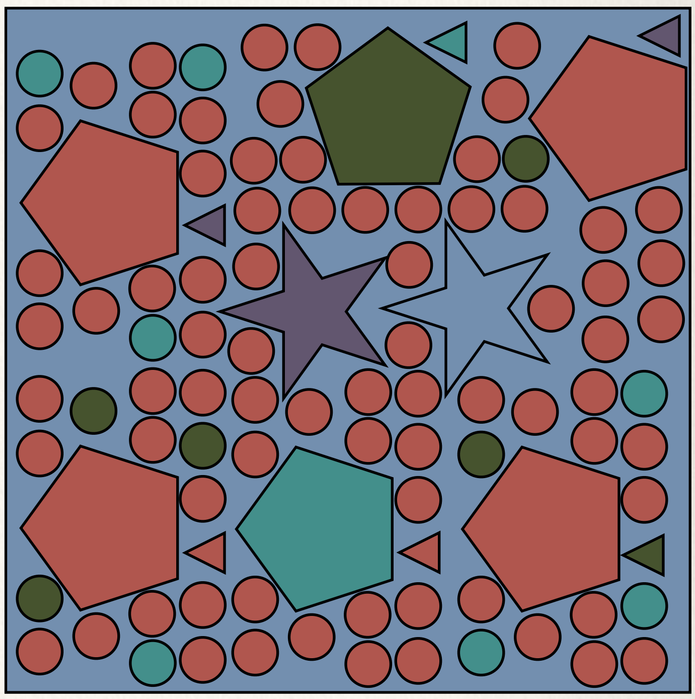

136
9
3
1
26
2
11
1
2
51
8
4
1
40
3
4
1
95
2
9
2
1
10
6
1
4
1
2
1
Novice
Senior
Em
Ad
Ma
X
Ov
Re
Gr

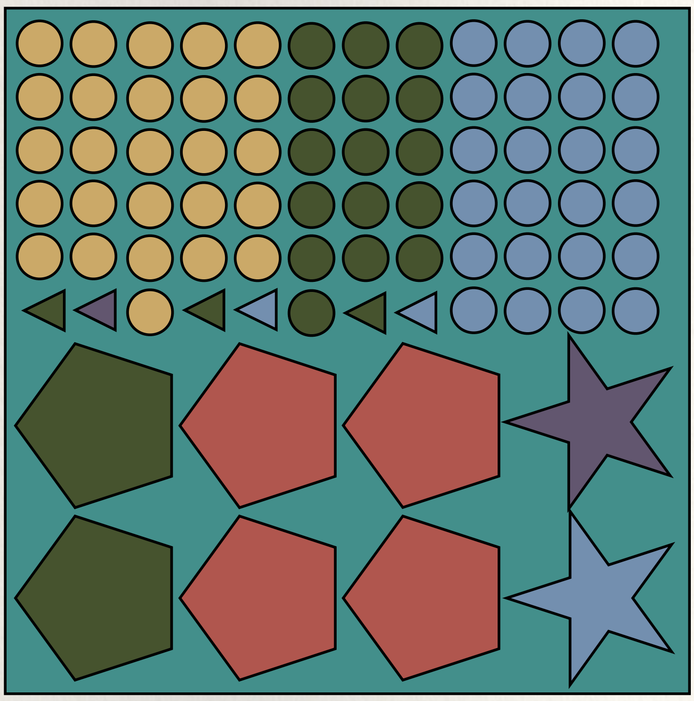
Em Ad Ma X Ov Re Gr

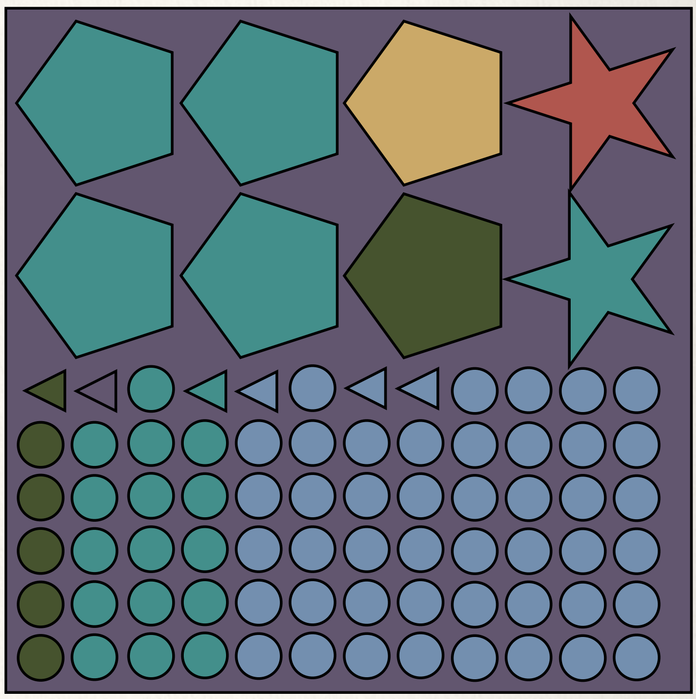
Novice Senior

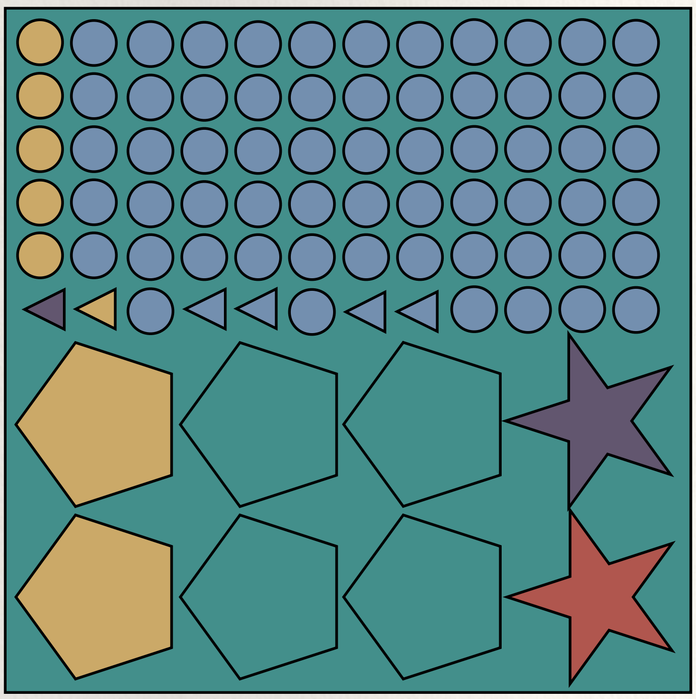












Design Assessment

Resource acquisition and allocation

Evaluations on user participation

conscripted interests and analysis for conflicts and and alignments

Education requirements

Continuous system efficacy (never ending introspection)

Robust feedback paths

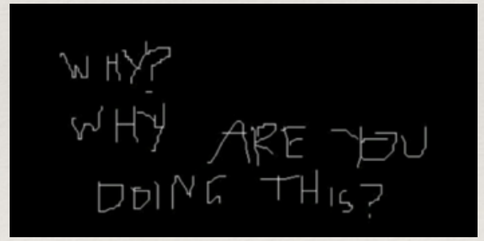
Appropriate voting techniques to ensure different voices/ ideas are given weight and taken into consideration and implemented

Any implemented system MUST account for differences between entities, where no entity should compare to an immutable model of perfection

Aaron Koblin:

http://www.aaronkoblin.com/work/thesheepmarket/

Draw a left facing sheep using Amazon's Mechanical Turk



How do we enable ourselves to avoid becoming monotonous consumers, and more so [producing] participants?

Design Assessment (continued)

Everything doesn't need to be comparable by a computer intuitively

Amazon's price searching requires a department to be chosen

Lowe's compare feature can only compare 4 items

How do we assess financial motivations?

Workload/contribution balance?

There is a desire to understand, and drilling down requires appropriate data

There is a desire to solve, and building up requires appropriate settings and adequate experience

Contribution Towards VT

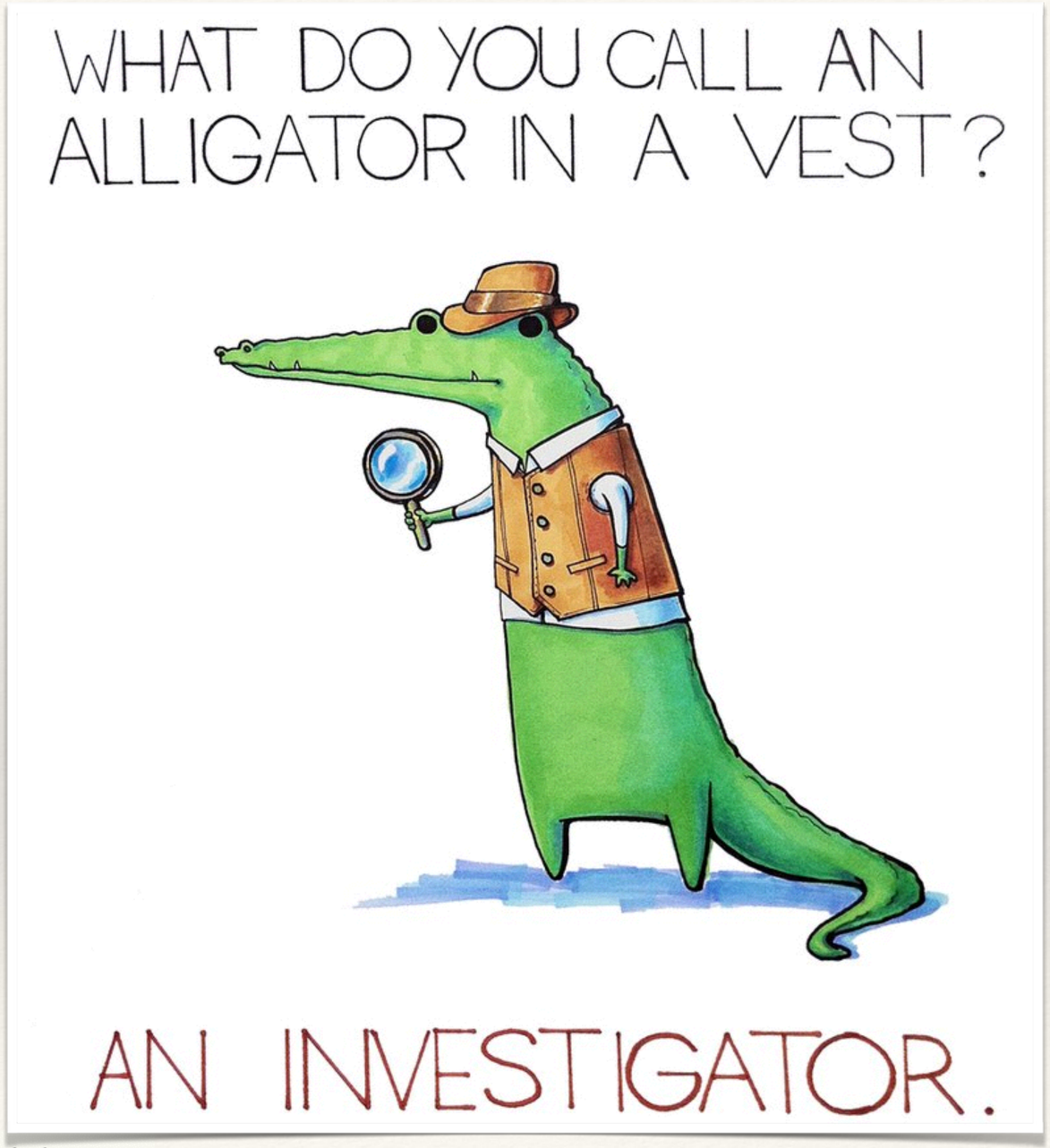
Since participation is necessary, is there a minimum, ideal, or maximum? How do we screen prospective students to achieve those percentages? What are the consequences if those percentages aren't met?

Potential Implementations

- Student Government
- Interdisciplinary interaction
- Graduate vs undergraduate interaction
- Student and Administration interactions
- Employee/Department communication

Conspicuous open data

Clear results



OR: A Snappy Dresser