

“Effectively supporting self-directed learning is one of the critical challenges in supporting lifelong learning” - G. Fischer

Do 21st Century Learning Environments  
Support Self-Directed Learning?:  
Middle School Students' Response to an  
Intentionally Designed Learning Environment



*Dr. Punya Mishra*  
*Chris Fabnoe*



# Why did SDL matter?



*In/Out School  
Competency*



You Tube



Google™

# Changes/Discussion in Pedagogy

- ✦ *Understanding by Design (UbD) - Wiggins & McTighe*
- ✦ *Problem-Based Learning (PBL)*
- ✦ *Technological Pedagogical Content Knowledge (TPACK) - Mishra & Koehler*
- ✦ *Individualization/Personalization of Learning Experiences (RtI)*
- ✦ *Gaming & Programming in Education - Gee, Resnick*
- ✦ *Habits of Mind - Costa & Kallick*

Σ

# Site

- ✿ *Middle to upper middle class suburban school in Midwestern state*
- ✿ *School houses nearly 900 students in grades 6 - 8*
- ✿ *High achieving school with strong parental support*

# Participants

Sigma	Alpha/Beta
Opt-in by parents	Regular selection
Specific PD for teachers	Regular PD for teachers
Flexible scheduling	37 min instructional periods
Transdisciplinary	Single subject
1-1 technology	Regular tech deployment
Focused on collaborative projects & exploration from interests	Traditional curriculum outcomes

# Teachers

- ✿ *Teachers in both environments had similar past outcomes as their peers based on state and local standardized tests (past 4 years of data)*
- ✿ *Teachers in both environments have very similar demographic data including years of service, education, and ethnicity*
- ✿ *Teacher effect cannot be discounted however the uniformity between teachers in both environments indicates substantial similarities*

# Wonders...

- ✿ *What were children capable of with less direct instruction?*
- ✿ *With lower barrier to operational use, what other options open up?*
- ✿ *How are motivation and self-directedness connected if at all?*
- ✿ *How does this look like in the classroom?*

# What did the research show?

- ✿ *Self-directed learning is a concept highlighted throughout 21st century learning frameworks*
- ✿ *Research on the impact of learning environments and technology on self-directedness with younger learners is limited*
- ✿ *Traditional school environments do not typically provide self-directed learning opportunities*

# SDL and Learning Environments

- ✦ *Certain learning contexts are more effective at promoting self-directed learning - Guglielmino (1977) and current learning environments continue to shift both within and outside the school due to the infusion of technology and connection to the Internet (webinars, iTunes U, virtual high schools, simulations, etc.)*
- ✦ *Characteristics of environments that can support SDL - effective integration of technology, problem-solving opportunities to independently pursue interests, constant feedback and reflection on learning goals, and variety of resources*

# 21st Century Frameworks - Skills/Environments

*Dan Pink  
Yong Zhao  
P21*

Learning Environments

Skills

Tech

*Teo  
Long  
Caffaella*

Individual

*ms team*

SDL

*Knowles  
Tough  
Candy*

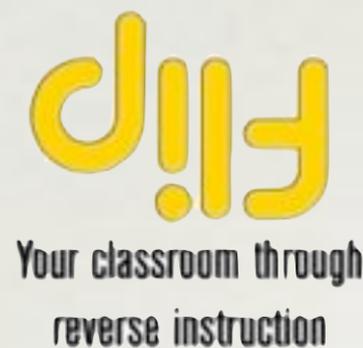
# SDL and 21st Century



◆ *Included in major 21st Century frameworks*

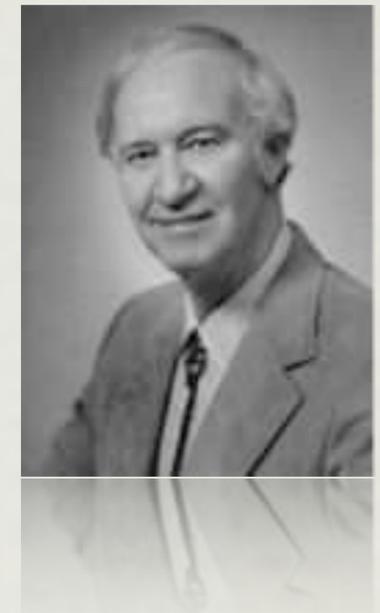


◆ *A central component to online learning and independent study in blended environments and virtual schools*



# SDL in Literature

- ✦ *1960 & 1970s - Allen Tough and Malcolm Knowles*
- ✦ *Focused on adult education*
- ✦ *Definitions vary but include the internal characteristics of the learner and some the external conditions impacting the learning*



# Definition

- ✿ *For this study, a conceptual definition that includes both the external and internal components was appropriate and derived from the work of Knowles (1975) and Hiemstra (1991):*
- ✿ *Self-directed learning is the combination of the characteristics of a learning environment (for example - structure, technology, pedagogy) and the characteristics of the individual learner that takes the initiative to engage in skill/knowledge development through a process that includes:*
  - ✿ *Selecting and managing appropriate resources*
  - ✿ *Setting defined learning goals*
  - ✿ *Troubleshooting obstacles or barriers to the learning progress*
  - ✿ *Continually assessing progress towards goals*
  - ✿ *Reflecting of progress and preparing for next steps*

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# Assessment Tools

- ★ *Various related tools available*
- ★ *OCLI, PRO-SDLS, Bartlett-Kotrlik Inventory of Self-Learning*
- ★ *Issues: all adult related (language and context), little reference to technology, and all were conducted in a disconnected manner to a learning environment (not situated)*

Selected Study	Subject	Findings
Smith (1988)	Planning students	Positive relationship between self-directed learning and course grade
Karunan (1990)	Distance education students	Self-directed learning related to achievement
Anderson (1993)	Social and political science students	Self-directed learning related to academic performance
Dunsmuir (1994)	Distance education students	Positive correlation between self-directed learning and GPA
Moss (1995)	Business students	Predicting academic success by self-directed learning
Huang (1997)	Distance education students	Positive relationship between self-directed learning and course grade
Quinn (1998)	Business, communication, public administration, and hospitality management students	Self-directed learning is one of the key factors leading to academic success
Haggerty (2000)	Biological students	Positive relationship between self-directed learning and achievement
Hsu & Chang (2005)	Distance education students	Predicting academic success by self-directed learning
Shawar (2007)	Engineering students	Self-directed learning related to learning outcome

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# Assessment Tools

- ✦ *Self-Directed Learning with Technology Scale (Tao, 2010)*
- ✦ *Appreciation of the role of technology and language more suitable to younger students*
- ✦ *Validated measurement tool focusing on perception of self-directed learning from school children*

# Instrumentation

- ✦ *Self-Directed Learning with Technology Scale (SDLTS) - 6-item, 2-factor scale to represent an individual's overall perception of self-directed learning with technology*
- ✦ *National Institute of Education in Singapore developed, piloted, and validated through a factorial and confirmatory factorial analysis*
- ✦ *Two factors: self-management and intentional learning*
- ✦ *Additional item validity and test-retest reliability are recognized areas*

# Instrumentation

## Self-Management

- ✿ 1. *I go online to ask my teachers questions on my lessons when I am not in school.*
- ✿ 2. *I use the computer to share my thoughts and ideas about my schoolwork (e.g., through multimedia storytelling, voice-recording, blogs).*

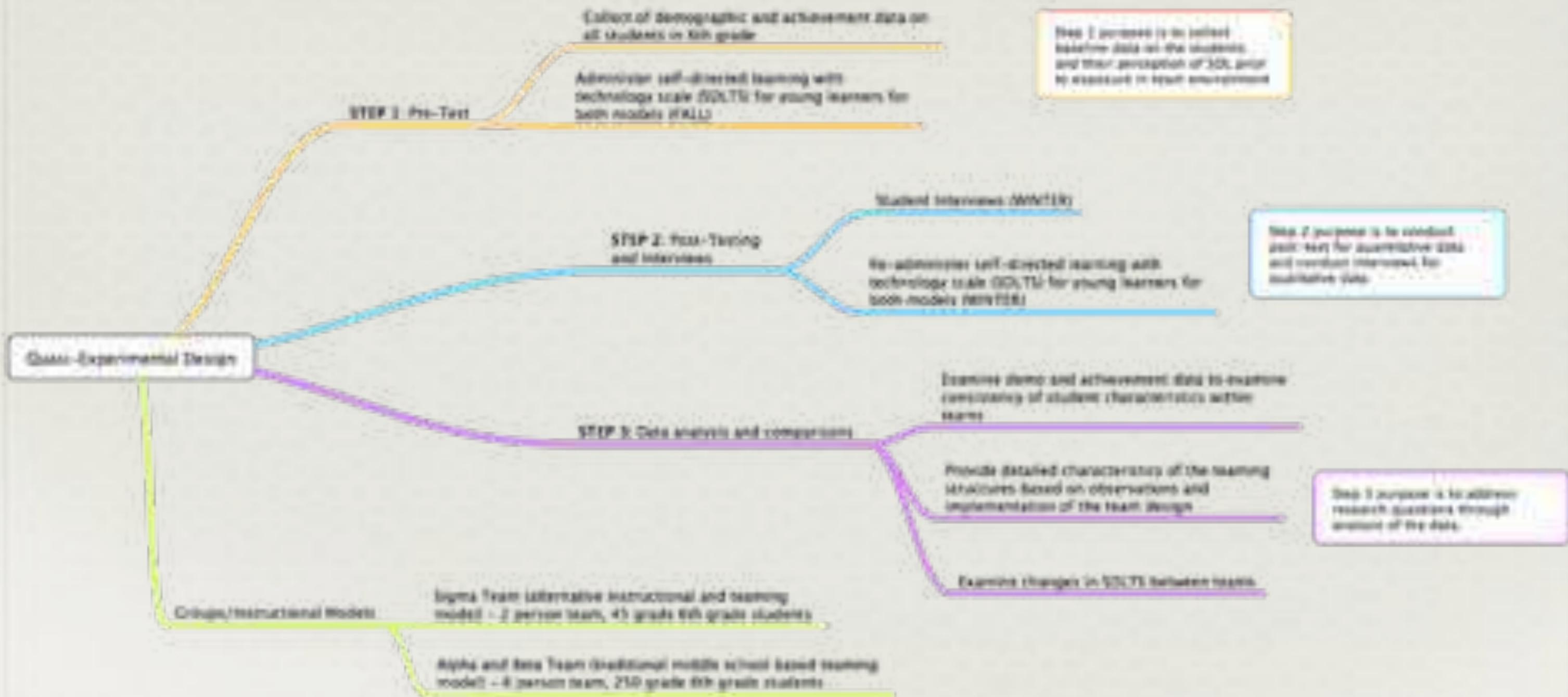
## Intentional Learning

- ✿ 3. *I find out more information on the Internet to help me understand my lessons better.*
- ✿ 4. *I use the computer to work with information for my learning.*
- ✿ 5. *I use the computer to become better at a skill that I am interested in e.g., learn a language.*
- ✿ 6. *I use the computer to get ideas from different websites and people to learn more about a topic.*

# Research Design & Method

# Research Question

- ✦ *How do intentionally designed learning environments impact the perception of self-directed learning for middle school students?*
- ✦ *It was anticipated that the students on the Sigma team would show a significant increase on the SDTLS than the Alpha/Beta students*



# Data Analysis

- ✦ *Quantitative - ANCOVA was used with SDLTS to minimize bias and error while removing initial differences between groups*
- ✦ *Qualitative - Student interviews to better understand experience of students*

# Quantitative Results

- ✿ *No violations of homogeneity of regression assumption on any item in scale*
- ✿ *5 of 6 items, the null hypothesis that students on the Sigma team will score the same as the Alpha/Beta team was rejected based on results*
- ✿ *Team membership proved significant on all items except one*
- ✿ *Results suggest that Sigma environment supports the development of self-directed learning perception*

*6 = None of the Time - 1 = All The time*

Survey Item	Sigma		Alpha/Beta		Sig.
	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	
1	5.06	4.70	5.16	5.29	0.006
2	4.61	4.26	5.19	5.38	0.000
3	3.29	2.83	3.82	3.78	0.001
4	3.00	2.39	3.97	3.83	0.004
5	3.77	3.13	4.41	4.23	0.002
6	2.94	2.87	3.65	3.62	0.808

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# Qualitative Analysis

- ✦ *Student interviews used to better understand the student experience*
- ✦ *Six interviews were conducted, recorded, and transcribed with same questions*
- ✦ *Three participants were randomly selected from each environment with two at the mean, two from one SD above, and two from one SD below on SDLTS*
- ✦ *Categories emerged from examining the transcripts and through the conceptual linkage between student responses*

# Qualitative Results

	Sigma	Alpha/Beta
Choice	Lots of choice on project topics including student interest and partners	Limited options for choice but would like more
Work Style	Combo of group work and individual work. Group work sometimes frustrating.	Majority of work was individual
Work Type	Multiple longer-term, project based experiences resulting in high interest	Majority of single lesson or unit experiences with worksheets/quiz
Technology	Aware of access, multiple devices, more freedom to use during the day, higher expectations to use outside of school	Available during the day for specific projects (classroom or lab). Only one example of outside class use

# Discussion

- ✦ *Online connections with teachers, utilization of technology throughout the learning process, increased self-management and intentional learning were more evident with the Sigma students based on both the qualitative and quantitative data.*
- ✦ *Short duration in the Sigma environment demonstrated significant findings on the perception of the self-directed learning*
- ✦ *Multiple factors to consider within the environment but it is clear that a different type of experience took place and schools should examine those factors*

# Limitations

- ✦ *Self-reporting during the learning process*
- ✦ *Generalizability based on the unique setting*
- ✦ *Variability within each learning environment (teachers, content, pace, technology)*
- ✦ *Student selected experience*
- ✦ *Role as researcher and educator*

# Future Work

- ✦ *Sigma team as originally designed will no longer be in place - what elements can persist or translate into existing models*
- ✦ *Scaling of SDL in primary, intermediate, middle school - what is possible functionally and developmentally?*
- ✦ *Explore concepts that emerged through observations and interviews- for example, a non-linear, self-directed approach is not always that comfortable. How do we help kids with setbacks, uncertainty, and failure?*

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