



Student Affect in CS1 Insights from an Easy Data Collection Tool

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### At the end of the course we asked

• Draw what programming means to you



#### **Research Questions**

- Can useful data about student affect be collected quickly and easily?
- Can such data provide insight into the design of curricular materials?
- Can such data identify struggling students?

#### **Affect Tool: Question One**



#### **Affect Tool Axes**

	Scale Descriptor	Scale Endpoint (-10)	Scale Endpoint (+10)	Axis
1	Interest	Boring	Interesting	Vertical
	Difficulty	Easy	Hard	Horizontal
2	Plan	Didn't know how to approach the problem	I had a clear plan	Vertical
	Familiarity	Content was all new	Content was familiar	Horizontal
3	Satisfaction	I feel frustrated	I feel triumphant	Vertical
	Improvement	My programming skills have not improved	My programming skills have improved	Horizontal

# **Danger Area- Boring and Hard**

![](_page_6_Figure_1.jpeg)

# **Familiarity and Planning**

![](_page_7_Figure_1.jpeg)

# Danger cells: frustrated and not improving

![](_page_8_Figure_1.jpeg)

#### **Student View**

![](_page_9_Picture_1.jpeg)

#### IN510 Programming 1 Checkpoint Tool

![](_page_9_Figure_3.jpeg)

# **Staff View**

![](_page_10_Figure_1.jpeg)

**Delete A Student** 

Η Update Graphs

# Danger reports Hard and Boring

![](_page_11_Picture_1.jpeg)

Lab ID	Student UserName	(Value	Y Value
13		7	-5
14		10	-1
3		4	-7
7		8	-6
8		10	-5
9		10	-4
15		9	-5
21		7	-1
22		6	-1
23		10	-10

![](_page_12_Picture_0.jpeg)

#### **Frustrated and Not Improving**

Lab ID	Student UserName	X Value	Y Value
23		-10	-10
19		-7	-5
28		-10	-4
3		-5	-5
8		-10	-10
9		-6	-10
13		-1	-2
14		-6	-3
15		-10	-10
18		-2	-4
11		-7	-2
15		-2	-1
22		-10	-10
2		2	2

# Failure to recognise programming patterns

![](_page_13_Picture_1.jpeg)

• Content seems all new and can't get started

Lab ID	Student UserName	X Value	Y Value
23		-10	-10
2		-3	-3
22		-3	-2
6		-9	-5
7		-8	-6
24		-5	-3
11		-4	-1
19		-5	-5
28		-10	-2
3		-7	-6
5		-7	-3
7		-10	-6

![](_page_14_Picture_0.jpeg)

#### **Create your own questions**

Tool 1: Labels & Category			
Current Category Name X :	Interest	New Category Name X :	Interest
Current Category Name Y :	Difficulty	New Category Name Y :	Difficulty
Current North Label :	Interesting	New North Label :	Interesting
Current South Label :	Boring	New South Label :	Boring
Current East Label :	Hard	New East Label :	Hard
Current West Label :	Easy	New West Label :	Easy
Tool 2: Labels & Category			
Current Category Name X :	Plan	New Category Name X :	Plan
Current Category Name Y :	Familiarity	New Category Name Y :	Familiarity
Current North Label :	I had a clear plan	New North Label :	I had a clear plan
Current South Label :	I did not know how to appoach these	New South Label :	I did not know how to appoach these
Current East Label :	Content was familiar	New East Label :	Content was familiar
Current West Label :	Content was all new	New West Label :	Content was all new
Tool 3: Labels & Category			
Current Category Name X :	Satisfaction	New Category Name X :	Satisfaction
Current Category Name Y :	Improvement	New Category Name Y :	Improvement

![](_page_15_Figure_0.jpeg)

All Labs Interest Rating for student Z

lab number

Boring - Interesting

![](_page_16_Figure_0.jpeg)

All Labs Difficulty Rating for student Z

lab number

Easy - Hard

![](_page_17_Figure_0.jpeg)

All Labs Plan Rating for student Y

lab number

No Plan - Clear Plan

![](_page_18_Figure_0.jpeg)

All Labs Familiarity Rating for student Y

lab number

All New - Content Familiar

![](_page_19_Figure_0.jpeg)

All Labs Frustration Rating for student X

lab number

![](_page_20_Figure_0.jpeg)

All Labs Improvement Rating for student X

lab number

# Insights into the Design of Curricular Materials

- Are the labs interesting
- Do they provide enough challenge

# Individual lab Feedback Sorting Lab

![](_page_22_Picture_1.jpeg)

Lab 24 Tool 1: Interest to Difficulty Comparison

![](_page_22_Figure_3.jpeg)

Easy - Hard

# Individual lab Feedback Sorting Lab

![](_page_23_Picture_1.jpeg)

![](_page_23_Figure_2.jpeg)

![](_page_23_Figure_3.jpeg)

My programming skills have not improved - My programming skills have improved

# **Interest ratings by lab**

![](_page_24_Figure_1.jpeg)

# **Difficulty ratings by lab**

![](_page_25_Figure_1.jpeg)

# Separate analysis after the course has finished

![](_page_26_Picture_1.jpeg)

# Normalised Scale Mean Profile for Introduction lab

![](_page_27_Figure_1.jpeg)

# Normalised Scale Mean Profile for Data Types Lab

![](_page_28_Figure_1.jpeg)

![](_page_29_Figure_0.jpeg)

# Normalised Scale Mean Profile for Arrays Lab Part 2

![](_page_30_Figure_1.jpeg)

# **Scale by Final Grade Correlations**

Response scale	r	Uncorrected p- value
Satisfaction	0.421	0.000*
Plan	0.305	0.009*
Improvement	0.270	0.022*
Difficulty	-0.146	0.222
Familiarity	-0.101	0.398
Interest	0.064	0.595

\* significant at  $\alpha$ = .05 by Simes

![](_page_32_Figure_0.jpeg)

### Questions

![](_page_33_Picture_1.jpeg)