

Uncovering Student Values for Hiring in the Software Industry

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Values and Pedagogy

- Bob Broad (Illinois State): What We Really Value
 - Rubrics as codification
 - Grading comments as what we really value
 - Student values and Faculty values
 - What if there is a mismatch?
 - How do we infer values?
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Exercise to Elicit Values

- “The Hiring Exercise”: ask students to make hiring choices for program manager and software development positions at a (fictitious) software company
 - Concrete vs. abstract
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Benefits of the Exercise

□ Benefits for Students:

- Reflect on skill sets
- Prepare students for hiring

□ Benefits for Researchers/Teachers:

- Identify program outcomes
 - Align student and program goals
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Outline

- The Hiring Exercise details
 - Research Questions
 - Data and Analysis
 - Reflection, Future Work
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Study Context

- University of Washington, Tacoma
 - 28 students in Ethics course
 - Read articles related to educational software, gender, and reverse discrimination [Campbell, Adam, Sher]
 - Hiring panel discussion
 - University of Portland
 - 7 students in Software Engineering course
 - Provided Adam and Sher articles as optional reading
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Hiring Exercise

- DotEdu: produces educational software
 - Need Program Manager and Software Developer for new product (SciSoft)
 - Choose a PM and SD from a pool of 4 candidates
 - Create a set of criteria for hiring
 - Justify the choices
 - List information they would like to know
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Post-Exercise

In-class discussion

- UWT: small groups, whole class
- UP: whole class

Survey

- What were the 2 most relevant points in the in-class discussion?
 - What were the 2 least relevant points in the in-class discussion?
 - What are your (possibly new) choices for PM and SD?
 - Why did you change your position (or not)?
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Candidates

□ Mary

- GPA: 3.7
- Instructor of C/C++ courses at community college
- Excellent teaching reviews
- Web page for local school
- Wants to be at a company that contributes to society
- Mostly strong in technical part of interview
- Likely to work well with others
- White female (ethnicity unknown)

□ Oscar

- GPA: 3.0
 - Weyerhaeuser / web dev.
 - Boeing (Intel) / software developer
 - Meets deadlines, works well with team
 - Web page for church
 - Trouble with intro science courses and wants to help freshmen
 - Expand scope of skills in software development
 - Had trouble with technical part of interview
 - Seemed unconfident, friendly, enthusiastic
 - Probably will work well with others
 - Hispanic male
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Candidates (cont.)

□ Joseph

- GPA: 3.8
- Co-founded GameHouse / Nintendo bought company
- Computer clubs in high schools
- Wants to continue with programming
- No trouble with technical part of interview
- Quiet person, but gets excited about software
- Probably will work well with others
- White male (Ethnicity unknown)

□ Michael

- GPA: 3.4
 - Manager of hardware store after high school
 - Microsoft / web dev.
 - Boeing (Nike)
 - Hard-working, contributed to design discussions
 - Not afraid to speak what he was thinking
 - Wants to give back to kids
 - Had some trouble with technical part of interview
 - Friendly, defends ideas
 - Black male
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Research Questions

 What were the criteria that students used?

 What personas did students develop in their justifications?

 What were students' hiring choices?

 How many students changed their hiring choices? Why?

Data: Hiring Exercise Deliverables, post-Exercise Surveys

Participant Population

□ UWT:

- 22 gave consent
- 20 males, 2 females

□ UP:

- 6 gave consent
 - 6 males, 0 females
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1. Criteria

□ Analysis

- Data: tables in hiring deliverables
 - Unit: criterion expressed in table
 - Method: content analysis
 - Grouping: bottom-up merging of criteria into similar categories
 - Themes: grouped categories into 5 themes
 - N = 25 (25 / 28 submissions included tables)
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1. Criteria Results

Theme	PM	SD
Technical Skills	25 (100%)	25 (100%)
Soft Skills	22 (88%)	21 (84%)
Previous Exp.	14 (56%)	15 (60%)
Personal Traits	12 (48%)	12 (48%)
Company/Job	11 (44%)	11 (44%)

2. Persona Development

□ Analysis:

- Data: Hiring deliverables
 - Unit: Single inference
 - **Inference:** a statement used in the argument that is not listed in the hiring brief
 - Example: “Joseph has a very strong understanding of software architecture.”
 - Method: Independently coded, argued to consensus
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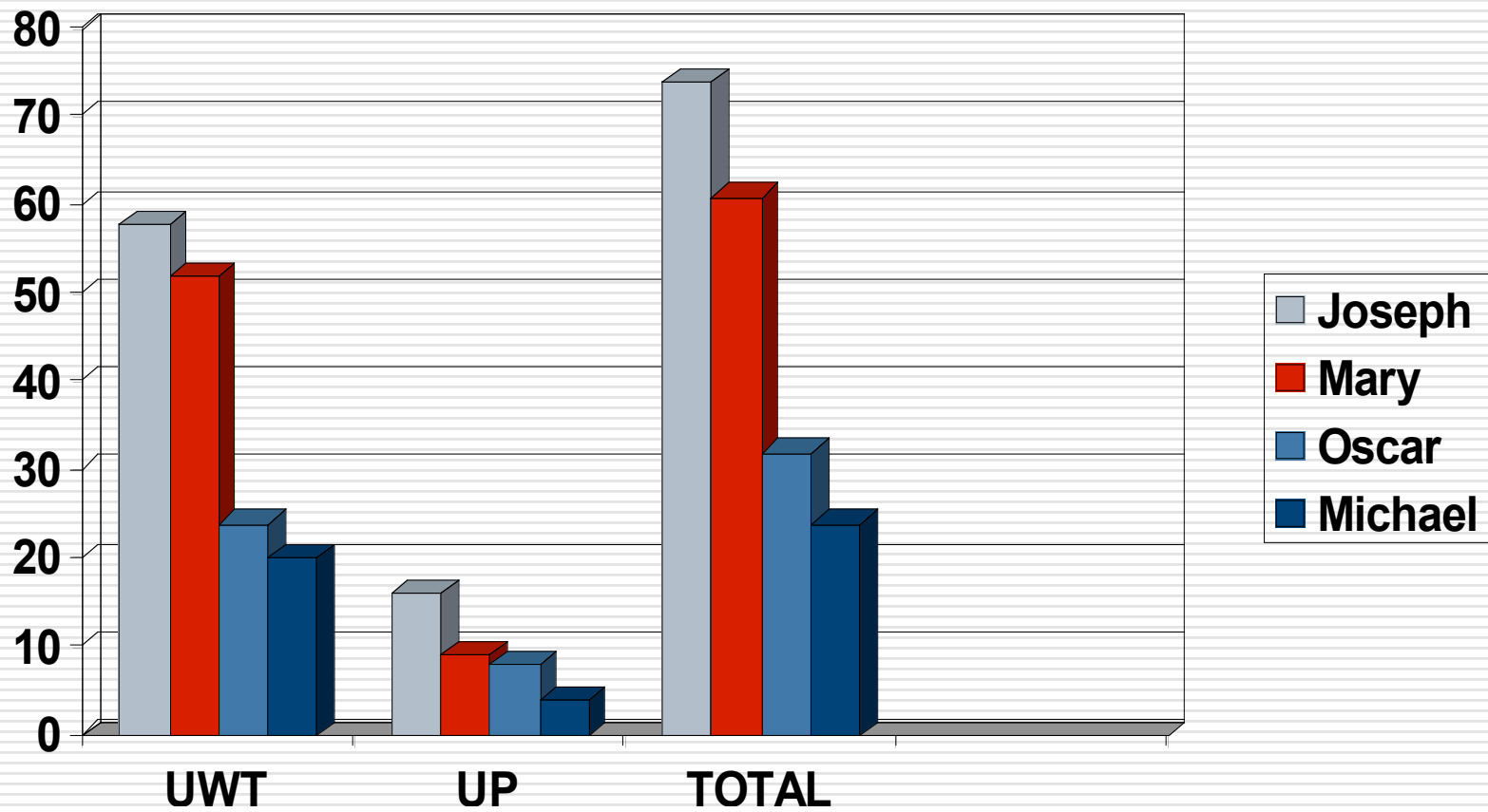
2. Persona Development (Mary)

Technical Skills	7	User understanding (females, educational software, enhance quality)
	3	Technical (C/C++ expertise, does not know BST vs. hash table, not strong)
Soft Skills	6	Communication (good skills, speak confidently, communicate with less competent people)
	11	Leadership/Supervision (management skills, leader, sympathize with team, encourage team, good supervisor)
	4	Organization (plan, organize, organize groups)
	5	Teamwork (people skills, women have more people skills)

2. Persona Development (cont.)

Personal Traits	4 8	Dedication (full potential, to students, commitment to education) Other (enthusiastic, well-rounded, passionate, confident, initiative, does not interview well)
Previous Experience	7	(grading into night, knows C/C++ to teach, work with school administration, learning environments, good teacher)
Company/Job	6	(suggest learning concepts, advance in company, aligned goals, sales/marketing, long duration)

2. Quantified # Inferences

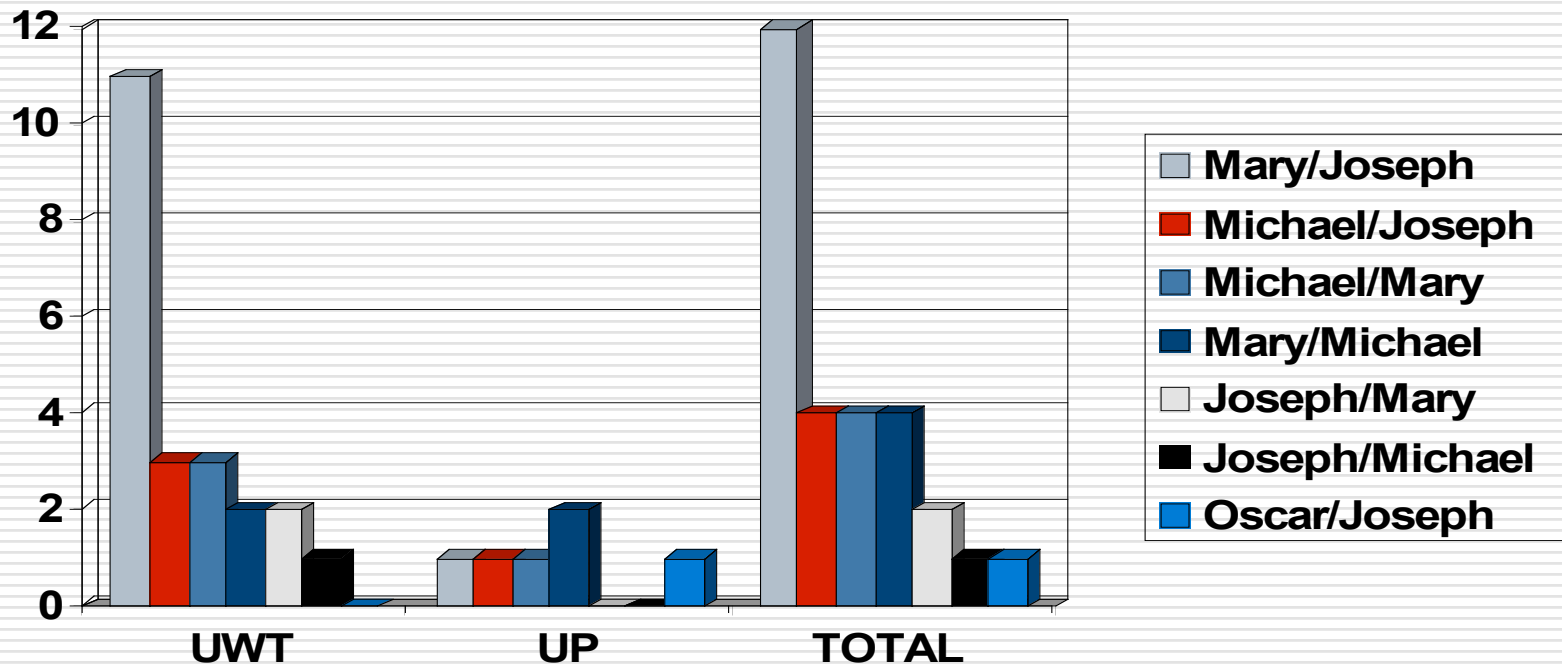


3. Hiring Choices

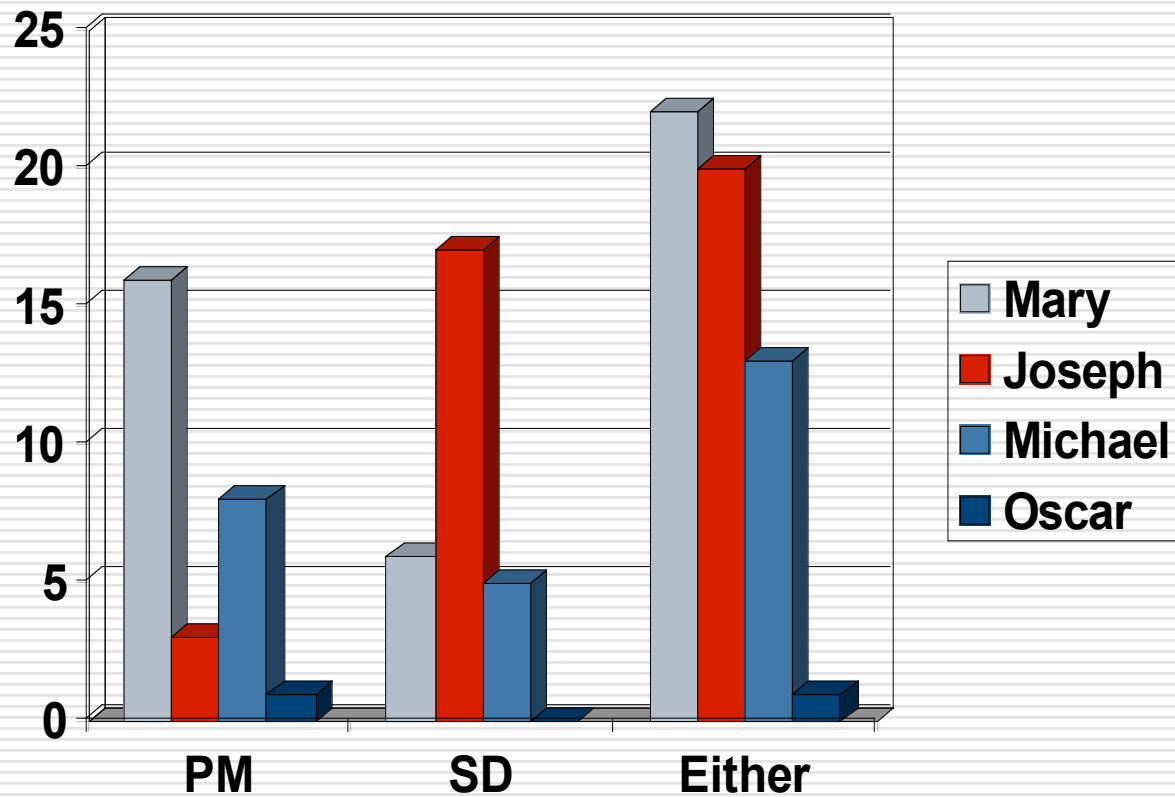
□ Analysis:

- Data: Hiring Deliverables
 - Unit: Choice for PM, Choice for SD
 - Method: Totals of unique pairs
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3. Results (PM/SD)



3. Results (by candidate)



Critique







- Effort to reduce bias:
 - 2 institutions
 - Hiring brief customized to local context
 - Independent coding, argue to consensus
 - Emergent categories for criteria
 - Pilot test of study

- Existing bias:
 - Some students did not consent
 - Two different courses
 - Students at different levels in program
 - Students prepared differently prior to exercise
 - Two different instructors led discussions
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Related Work

- ❑ Surveyed/interviewed IT professionals to determine important non-technical skills [Bailey & Stefaniak]
 - ❑ Surveyed CIOs about important skills [Ferguson]
 - ❑ Identified factors to recruit and retain underrepresented employees [Tapia & Kvasny]
 - ❑ Surveyed aerospace/defense companies to learn of important skills in engineering graduates [Lang *et al.*]
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Future Work

-  Examine role of diversity and gender in hiring choices [SIGCSE 2008 submission]
 -  Switch gender of candidates [SIGCSE 2008 submission]
 -  Switch ethnicity of candidates
 -  Build taxonomy of inferences about job responsibilities for PM/SD positions
 -  Code information students sought
 -  Administer activity to university faculty and working professionals
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Conclusions

- ❑ Gained insight as to what students think are important skills
 - ❑ Students inferred traits of candidates
 - ❑ Mary and Joseph were popular candidates
 - ❑ Few UWT students changed their minds (15%) while many UP students changed their mind (67%)
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Acknowledgments

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- Faculty who conducted exercise
- Beth Simon and Catherine Spencer

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4. Changes in Decisions

□ Analysis:

- Data: Surveys
 - Unit: Answer to Question 4
 - Method: Total # changed and why
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4. Who Changed?

PM/SD Before	PM/SD After	TOTAL	UWT	UP
Mary/ Joseph	Mary/ Michael	1	1	0
Michael /Joseph	Mary /Joseph	2	1	1
Michael /Mary	Mary /Joseph	2	1	1
Oscar /Joseph	Re-open /Joseph	1	0	1
Mary/ Michael	Mary/ Oscar	1	0	1

Reasons: previous experience, diversity considerations, people skills, leadership skills, reaching consensus
