

Seeking Exemplars in the Wild: Exploring How Students Find Design Examples to Support Personalized Learning

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ABSTRACT

Examples help students learn insights about key domain principles and processes. However, little is known about how students leverage the Web to discover and learn from examples. In a comparative study, seventy undergraduate students leveraged three types of platforms—*search*-based, *crit*-based, and *portfolio*-based platforms—to find examples that represent contrasting cases of two design principles. Students reported how each platform’s features and mechanisms affected their approach. We identify three main strategies students employed for finding examples on the Web: developing keywords, visually comparing multiple examples, and leveraging community feedback to assess example quality. Our results also indicate that, despite giving access to many examples, none of the existing platforms provide explicit support for learning. We distill three guidelines for creating learner-centered online design galleries to help future learners gain design knowledge.

CCS CONCEPTS

- Human-centered computing → Interaction Design ; Empirical Studies in Interaction Design.

KEYWORDS

creativity; examples; online community; design; personalised learning

ACM Reference Format:

Yu-Chun Grace Yen and Steven P. Dow. 2022. Seeking Exemplars in the Wild: Exploring How Students Find Design Examples to Support Personalized Learning. In *Proceedings of the Ninth ACM Conference on Learning @ Scale (L@S '22)*, June 1–3, 2022, New York City, NY, USA. ACM, New York, NY, USA, 4 pages. <https://doi.org/10.1145/3491140.3528303>

1 INTRODUCTION

Examples are powerful tools for learning innovation and design [5, 17]. Prior work has shown that examples can supplement personalized feedback [10] or other forms of instruction [8]. Examples can also provide inspiration and suggest alternative solutions to a creative problem [9, 11, 12]. Research has indicated that designers benefit from getting examples on demand [18] and throughout a

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L@S '22, June 1–3, 2022, New York City, NY, USA

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ACM ISBN 978-1-4503-9158-0/22/06...\$15.00

<https://doi.org/10.1145/3491140.3528303>

design process [11]. Furthermore, showing examples in contrast can further aid learning by highlighting how a key principle (such as the layout or color theme of a webpage) is enacted or violated in practice [4, 8].

The modern Web now provides an incredible resource for finding design examples. Increasingly, creative practitioners share their work online to solicit feedback, showcase skills, and distribute knowledge [7, 13]. Learners can therefore browse the examples and observe how others go about their creative processes. Popular design communities such as Behance [1] and Dribble [2] (*portfolio*-based) organize their content using a gallery view and allow users to filter content based on characteristics of the examples (e.g. color or type of a creative project). Discussion forums such as r/design_critiques [3] (*crit*-based) enable users to view others work and engage in discussions around the design. A learner can also use *search*-based platform such as Google to find learning resources for self-learning.

For examples to be effective for learning, a learner must be able to discern what concepts have been executed well in the example [15]. Prior work, however, has shown that novices often lack the requisite domain knowledge to assess what examples are most relevant or how to apply them to improve their own work [6]. Replicating surface details in the given example without knowing why it worked may cause fixation and conformity to that example [14]. While students may have many examples at their finger tips, the Web typically does not necessarily organize them to support learning. Prior work has shown that novices often ignored examples or did not find them useful even when supplied with a gallery of good examples [16].

To realize the potential of using examples on the Web for personalized learning, our research explores how novices leverage existing platforms to find examples for learning. What language do they use to find examples of interest? How do different types of platforms—*search*-based vs. *crit*-based vs. *portfolio*-based—affect their strategies? Also, to what extent do learners perceive online platforms as a learning environment? In this paper, we report the results of a survey study investigating students’ (N=70) current strategies and struggles when searching examples for a visual design assignment. In the assignment, the students each used an assigned platform to find contrasting examples for two design concepts.

Our results indicate that none of the existing platforms are ideal for learning key domain principles in visual design. Students who used *search*-based platforms (i.e. Google) reported lacking the domain knowledge to specify relevant keywords for search. With the *portfolio*-based platform (i.e. Dribble and Behance), students had trouble finding examples that match their skill level or that contrast with good examples. *Crit*-based platforms (i.e. Reddit) contain

examples of variable quality, making it easier to find contrasting examples. However, students found the user interface made it difficult to visually compare multiple examples at once. Towards the goal of creating design galleries that support learning, students expressed a desire for browsing examples from peers and a willingness to share their own work for future learners. We offer design implications of how might we design a learner-centered design community that not only encourages feedback on individual projects but also supports learning at scale.

2 METHOD

We conducted a survey study investigating students' current strategies and pain points when searching examples on the Web. The course we surveyed was an introductory design course offered in a university in the U.S. One of the class modules was to learn the key design principles in graphic and interaction design. In the four-week self-contained unit, the students were expected to create a poster for a given prompt and iterate on it based on feedback provided by both the instructors and the peers. At the beginning of the course module, the students were asked to find four posters from an assigned platform that are (1) easy to understand (2) hard to understand (3) visually appealing and (4) not visually appealing. The examples represent two sets of contrasting examples.

As a part of the assignment, students wrote responses to the following questions. (1) *Describe your strategies for finding good and bad posters on [the assigned platform].* (2) *Explain any frustrations you experienced when using [the assigned platform] to find examples.* (3) *If you were creating a poster, would you share it online (i.e. outside of your class) and discuss your work with others? Why or why not?* Responses to the questions enable us to gain deeper understanding of how the current platforms support learning and the students' perspectives of online communities as learning environment.

2.0.1 Platform Surveyed. Four online platforms were surveyed in the study: one *search-based* (Google), two *portfolio-based* (Dribble and BeHance) and one *crit-based* (r/design_critiques) platforms. These platforms represent different types of online spaces where a user can find examples for self-learning.

Each student was assigned to use one of the four platform to complete the assignment. This allows us to explore how different user interfaces and interactions affect the strategies for searching examples. Seventy students completed the survey. The authors examined the open-ended responses collaboratively, extracting patterns and insights that inform the tool design. We briefly describe our findings in the following paragraphs.

3 RESULTS

We identified three main strategies students employed for finding contrasting examples on the Web.

3.1 Brainstorm Keywords for Search

Students using Google (search-based platform) mainly perform keywords search to search for examples through keywords. Some students used the example prompt verbatim (e.g. easy to understand), while others brainstormed other words. One student described his strategy for searching "easy to understand" posters by using different but related concepts,

"I use keywords that are not related to the goal, for example, rather than "easy to understand", I used words like "minimalistic" or "simple" posters. This works better than having a whole phrase since keywords are small adjectives used to typically categorize posters." [Google, Male P5]

Students also leveraged their own experience and knowledge to look for specific examples. One student explained how she found good examples,

"My first strategy was to think of places that held events. This made me look through our school events calendar to see if any of their posters fit the criteria of what I was looking for. Next I thought about posters people would collect, like national geographic. Images can be very visually engaging. [...] Lastly I thought about posters that anyone can recognize, like movie posters." [Google, P12]

To expand the example collections, students also used the "Related Image" function on the Google platform.

While search-based platform provides access to any examples available on the Web, many students struggled with the searching process due to the insufficient knowledge about how to develop effective keywords. One student explained the challenge she faced during the task,

"My biggest frustration is always not knowing what to search up. There are so many options and so many different results will pop up that it is very frustrating." [Google, Female P6]

Since Google is not a design-oriented community, students often need to refine their keywords to filter irrelevant content.

"I had to refine my keywords when searching otherwise my results wouldn't be useful. For example, when I searched 'bad poster', I received a good amount of Breaking Bad posters." [Google, Male P4]

In sum, a paradoxical situation occurs when students use search-based platform for finding examples—to be able to find examples, a person must possess the requisite domain knowledge to specify effective keywords, but novices often lack the knowledge. A computational aid is needed to guide the searching process.

3.2 Visually Compare Multiple Examples

When viewing examples in portfolio-based platforms (Behance and Dribble), students reported conducting visual comparisons among collections of design images. One student described how he found examples through visual comparison,

"For good posters, I would scroll through the page and then look for the most eye-catching posters that would make me take a double take. [...] For bad posters, I had to scroll through much slower to actually see which posters were not as effective in garnering attention. In a sense it was reverse psychology as I had to click into the posters that I did not want to click on because they were not as appealing." [Dribble, Male P8]

In our study, students who used portfolio-based platform were better at describing the underlying principles that were implemented in the example. This may be due to the fact that viewing multiple examples helps learners better identify the underlying concepts within examples[8]. One student considered the principle of symmetry, use of color, and the delivery of message when selecting the examples.

"I looked for posters that utilized symmetry, or if they did not have symmetry, they were at least easy to look at and understand. I also looked for posters that did not use too many colors to make it visually unpleasant to look at, and text that was too small fell under the bad poster category for me. Overall, I looked for clean designs that clearly portrayed the message." [Dribble, Male P4]

However, browsing a large amount of examples can be overwhelming. A student explained her frustration when being exposed to mountains of examples,

'One of the frustrations I experienced was the sheer amount of results that came up. It was extremely difficult to look through all of them and "critique" them to the standards that I was looking for because it took a lot of brain power to reason." [Behance, Female P28]

While providing diverse examples may help learners better identify the key concepts and generate more creative ideas, novices need additional support on how to navigate and make sense of the examples.

3.3 Assess Example Quality based on Community Feedback

Across platforms, students expressed the challenge of assessing example quality due to their lack of design expertise and experience. They also shared how they leveraged the feedback given to a design to help assess the example.

Two student in the r/design_critiques condition explained how they used the discussion content to reaffirm her judgment about the example,

"When I was looking for posters, I was mostly basing my opinions on gut feeling, however I also paid attention to how certain posters approached white space, color, and other stylistic elements. I also checked the comments to see what other users thought about the poster given that alternative opinions can be very helpful in design." [Reddit, Female R17]

"I will also directly search for keywords, such as "good" and "bad", which may sound very unreliable, but I also need to refer to some other people's opinions to help me judge." [Reddit, Male R2]

Beside using feedback to help evaluate example quality, students also found feedback useful for gaining design knowledge. For example, one student developed new search keywords after reading a thread of discussions.

"When I clicked on the post, I read through the comments and I actually found many descriptive, thorough, and helpful critiques. Many of them had great suggestions

that I also took into account when finding good and bad posters." [Reddit, Male R18]

However, the current interface of the crit-based platform requires their users to view examples one by another, making it hard to visually compare multiple examples, let alone reading corresponding comments.

Students using portfolio-based platforms (Behance and Dribble) also leveraged social signals in the site such as "Most Appreciated" or "Most Viewed" to find good posters, but the same approach did not help them find contrasting examples, as low quality designs are rare in such portfolio-based platforms.

3.4 DISCUSSION AND FUTURE WORK

Based on the survey results, we offer several implications for how to build a tool that supports creative learning by enabling learners to quickly browse and identifies examples that are most relevant for learning key domain principles.

- **Adding Information Cue to Facilitate Sensemaking:** The interface for presenting examples should facilitate sensemaking of the examples. Additional information is needed to surface the key insights one could learn from each example. Imagine a user who receives a piece of feedback about the layout and composition of her webpage, the tool may highlight the examples in a gallery that share similar issues. The tool can also present the evolution of a example, demonstrating how others resolve similar issues.
- **Toward a Learner-centered Example Curation:** Existing design communities typically prioritize examples that conform to the current trends or receive high appreciation. Students in our study indicate the need for viewing past and more diverse examples for learning. Also, viewing contrasting examples is an effective learning strategy. An algorithm can also help select examples that best represent a contrasting case for learning a specific principle.
- **Consider Learning Objective When Designing User Interaction:** Our students reported lacking domain knowledge to filter examples, making the searching process ineffective. A tool may guide the searching process by enabling searching by learning objectives. For example, a tool may structure a collection of examples based on their key concepts and allow users to interact and navigate the examples based on the learning goal.

To demonstrate how these implications could be embodied in a tool, we are currently building a prototype that transforms a collection of past student projects into an interactive design gallery. Our next step is to evaluate how a gallery, with or without these strategies, affects novice example search and the learning outcomes.

4 CONCLUSION

Browsing examples on the Web can gain inspiration, but can it support learning? This paper presents an exploratory investigation of how learners search examples on the Web for learning key design principles. We aim to inform design of a personalized learning tool that transform online examples into a searchable repository so that a novice can better find examples that support learning. To study this possibility, we surveyed undergraduate students about

their strategies and pain points when searching examples online for a visual design assignment. We report our findings and discuss implications for design of a tool that can add value to online creative communities.

ACKNOWLEDGMENTS

This work was supported in part by NSF awards 2030859 and 1821618. We also thank all the student participants for sharing insights for our survey study.

REFERENCES

- [1] 2019. Behance. <https://behance.net>.
- [2] 2022. Dribble. <https://dribble.com>.
- [3] 2022. /r/design_critiques. https://reddit.com/r/design_critiques/.
- [4] Louis Alfieri, Timothy J Nokes-Malach, and Christian D Schunn. 2013. Learning through case comparisons: A meta-analytic review. *Educational Psychologist* 48, 2 (2013), 87–113.
- [5] Robert K Atkinson, Sharon J Derry, Alexander Renkl, and Donald Wortham. 2000. Learning from examples: Instructional principles from the worked examples research. *Review of educational research* 70, 2 (2000), 181–214.
- [6] Michelene TH Chi, Paul J Feltovich, and Robert Glaser. 1981. Categorization and representation of physics problems by experts and novices. *Cognitive science* 5, 2 (1981), 121–152.
- [7] Patrick A. Crain and Brian P. Bailey. 2017. Share Once or Share Often? Exploring How Designers Approach Iteration in a Large Online Community. In *Proceedings of the 2017 ACM SIGCHI Conference on Creativity and Cognition* (Singapore, Singapore) (CC '17). Association for Computing Machinery, New York, NY, USA, 80–92. <https://doi.org/10.1145/3059454.3059476>
- [8] Dedre Gentner, Jeffrey Loewenstein, and Leigh Thompson. 2003. Learning and transfer: A general role for analogical encoding. *Journal of educational psychology* 95, 2 (2003), 393.
- [9] Scarlett R. Herring, Chia-Chen Chang, Jesse Krantzler, and Brian P. Bailey. 2009. Getting Inspired! Understanding How and Why Examples Are Used in Creative Design Practice. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Boston, MA, USA) (CHI '09). Association for Computing Machinery, New York, NY, USA, 87–96. <https://doi.org/10.1145/1518701.1518717>
- [10] Hyeonsu B. Kang, Gabriel Amoako, Neil Sengupta, and Steven P. Dow. 2018. *Paragon: An Online Gallery for Enhancing Design Feedback with Visual Examples*. Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3173574.3174180>
- [11] Chinmay Kulkarni, Steven P Dow, and Scott R Klemmer. 2014. Early and repeated exposure to examples improves creative work. In *Design thinking research*. Springer, 49–62.
- [12] Brian Lee, Savil Srivastava, Ranjitha Kumar, Ronen Brafman, and Scott R Klemmer. 2010. Designing with interactive example galleries. In *Proceedings of the SIGCHI conference on human factors in computing systems*. 2257–2266.
- [13] Jennifer Marlow and Laura Dabbish. 2014. From Rookie to All-Star: Professional Development in a Graphic Design Social Networking Site. In *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work Social Computing* (Baltimore, Maryland, USA) (CSCW '14). Association for Computing Machinery, New York, NY, USA, 922–933. <https://doi.org/10.1145/2531602.2531651>
- [14] Richard L Marsh, Joshua D Landau, and Jason L Hicks. 1996. How examples may (and may not) constrain creativity. *Memory & cognition* 24, 5 (1996), 669–680.
- [15] Tricia J. Ngoon, C. Ailie Fraser, Ariel S. Weingarten, Mira Dontcheva, and Scott Klemmer. 2018. Interactive Guidance Techniques for Improving Creative Feedback. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) (CHI '18). ACM, New York, NY, USA, Article 55, 11 pages. <https://doi.org/10.1145/3173574.3173629>
- [16] Tricia J. Ngoon, Joy O Kim, and Scott Klemmer. 2021. *ShöWn: Adaptive Conceptual Guidance Aids Example Use in Creative Tasks*. Association for Computing Machinery, New York, NY, USA, 1834–1845. <https://doi.org/10.1145/3461778.3462072>
- [17] Donald A Schön. 1985. *The design studio: An exploration of its traditions and potentials*. International Specialized Book Service Incorporated.
- [18] Pao Siangliulue, Joel Chan, Krzysztof Z. Gajos, and Steven P. Dow. 2015. Providing Timely Examples Improves the Quantity and Quality of Generated Ideas. In *Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition* (Glasgow, United Kingdom) (CC '15). Association for Computing Machinery, New York, NY, USA, 83–92. <https://doi.org/10.1145/2757226.2757230>