

SKETCHNOTING COMPARED, INDUSTRIAL DESIGN AND ELECTRICAL ENGINEERING

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ABSTRACT

This visual paper compares different approaches to teaching and learning sketchnoting in electrical engineering and industrial design education. Sketchnoting is a visual note-taking and sense-making methodology, which breaks down complexity using simple shapes and text, treating the page as an open canvas. Due to its simplicity in terms of visual fidelity and detailing, it has broad applications ranging from explanatory observation and sense-making, to exploratory collaborative visual thinking. Over the course of three years, sketchnoting has been taught in the classroom and in workshops reaching close to 1000 students, faculty, and staff across this campus. Several studies have been conducted in regard to investigating the effectiveness of sketchnoting for lecture note-taking, study note-development, ideation, planning, and group ideation. Comparing electrical engineering students to industrial design students the former face a higher barrier to sketchnoting. The latter are getting exposed to traditional observational drawing and sketching commonly starting in their first year of study. Sketching is reinforced focused on product ideation sketching and high fidelity photo-realistic rendering. Traditionally, engineering education does not emphasise sketching in such an in depth manner although it requires an essential ability to visually communicate and explore problem spaces. This paper visualizes different learning and teaching styles as well as how sketchnoting creates meaning for both disciplines.

Keywords: Sketchnoting, visual sense-making, creative confidence

1 INTRODUCTION

Over the past ten years sketchnoting has gained more and more traction resulting in it being increasingly implemented into the curriculum [1] [2] [3] [4]. Originally conceived as visual note-taking framework, sketchnoting provides an approach to visually synthesize what was heard seen and thought using simple visuals, frames, connectors, and text [5]. Complex information can be broken down using this framework to explore and visualize problems as well as to develop high-level concepts [6] [7].

As such this paper visually explores different learning and teaching styles as they pertain to electrical engineering and industrial design first, to then explore sketchnoting and its effectiveness in both contexts.

Questions that informed this research:

- 1) How is sketchnoting used in electrical engineering and industrial design?
- 2) Does sketchnoting foster a sense of creativity?
- 3) What is the role of sketchnoting in each discipline?

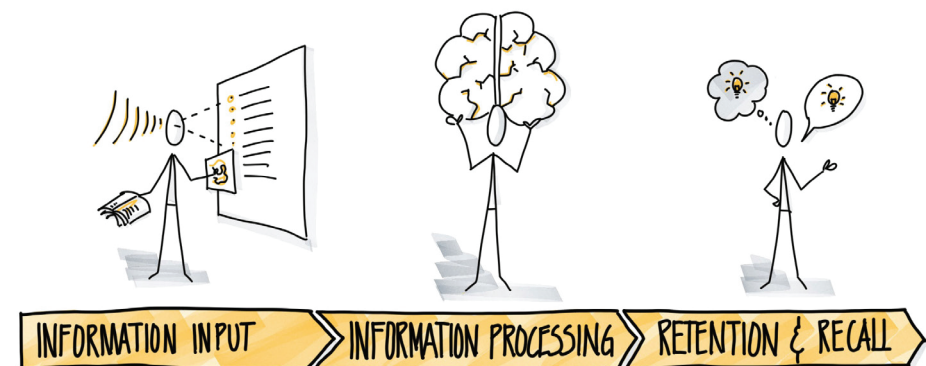


Figure 1. Information processing

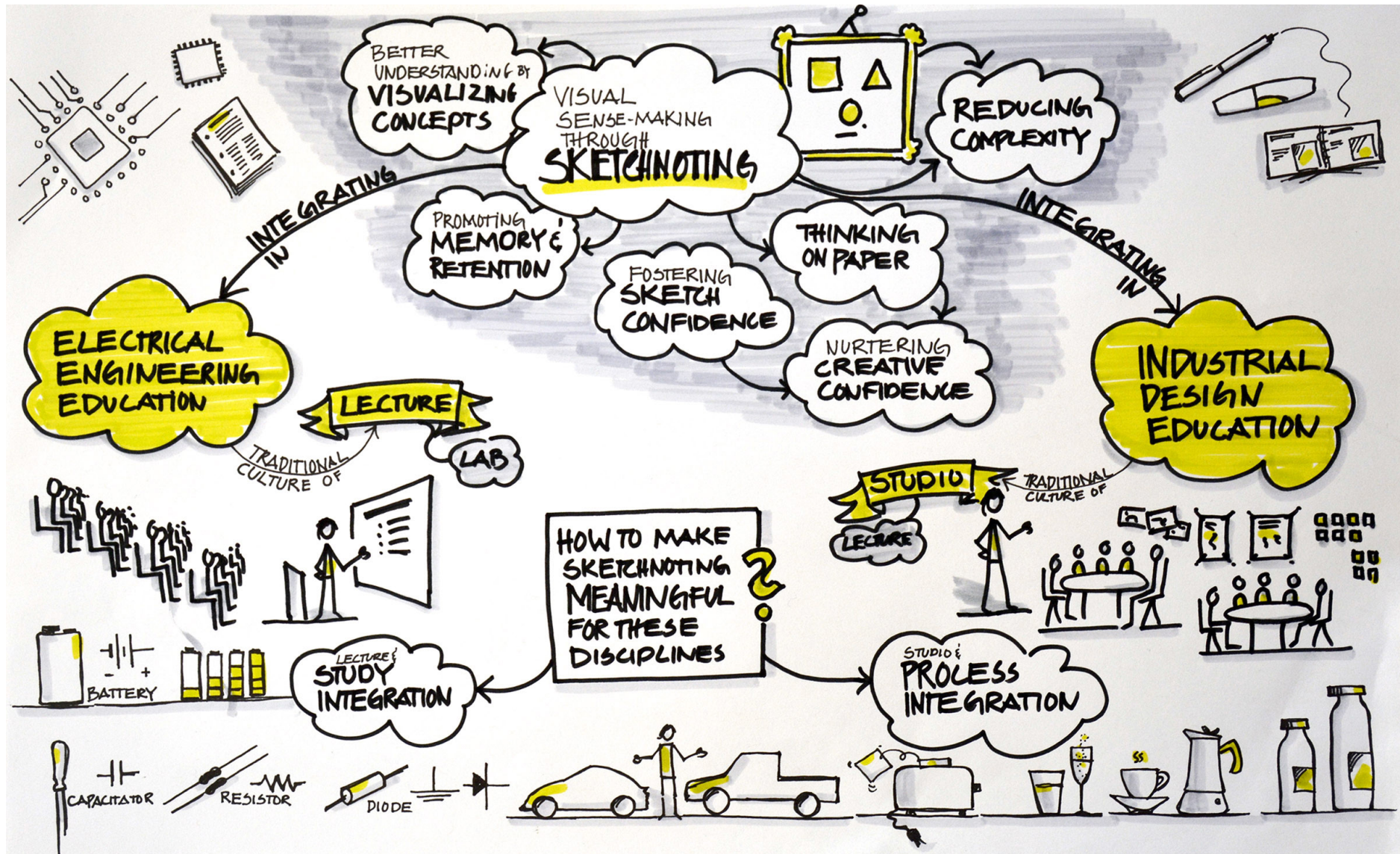


Figure 2. Assumed differences of sketchnoting in electrical engineering and industrial design.

2 VISUAL LITERATURE EXPLORATION

Typical teaching styles comparing industrial design and electrical engineering education show that, according to Connor, Karmokar & Wittington [8]”chalk

talk” is still the dominant engineering pedagogy. Whereas, “learning by doing” is the pedagogy most commonly applied in design education. [9]

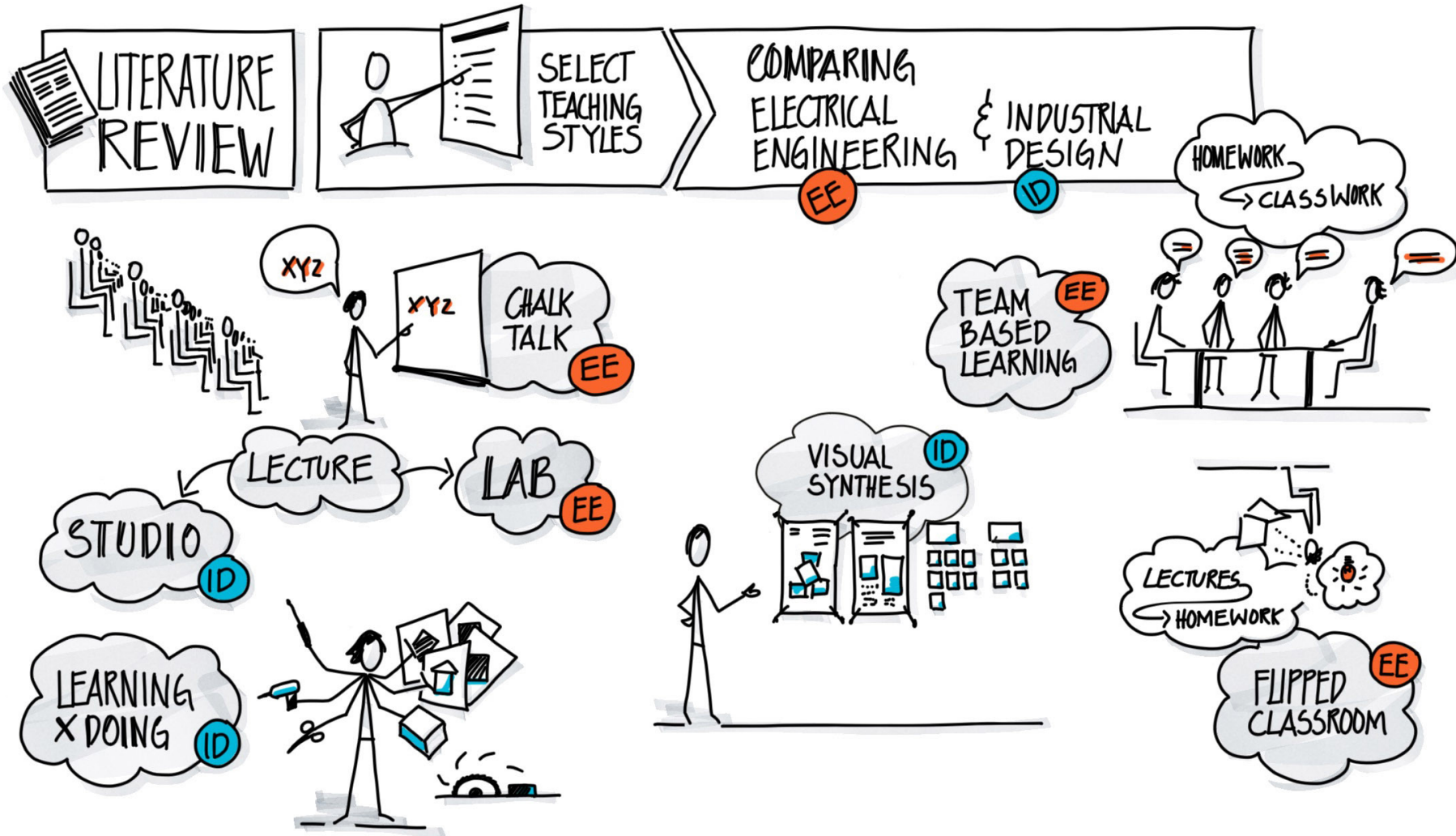


Figure 3. Select teaching styles

The following visual shows an information processing flow and visual interpretation of various learning styles as discussed by Lee and Sidhu [10] in order to find commonalities and patterns.

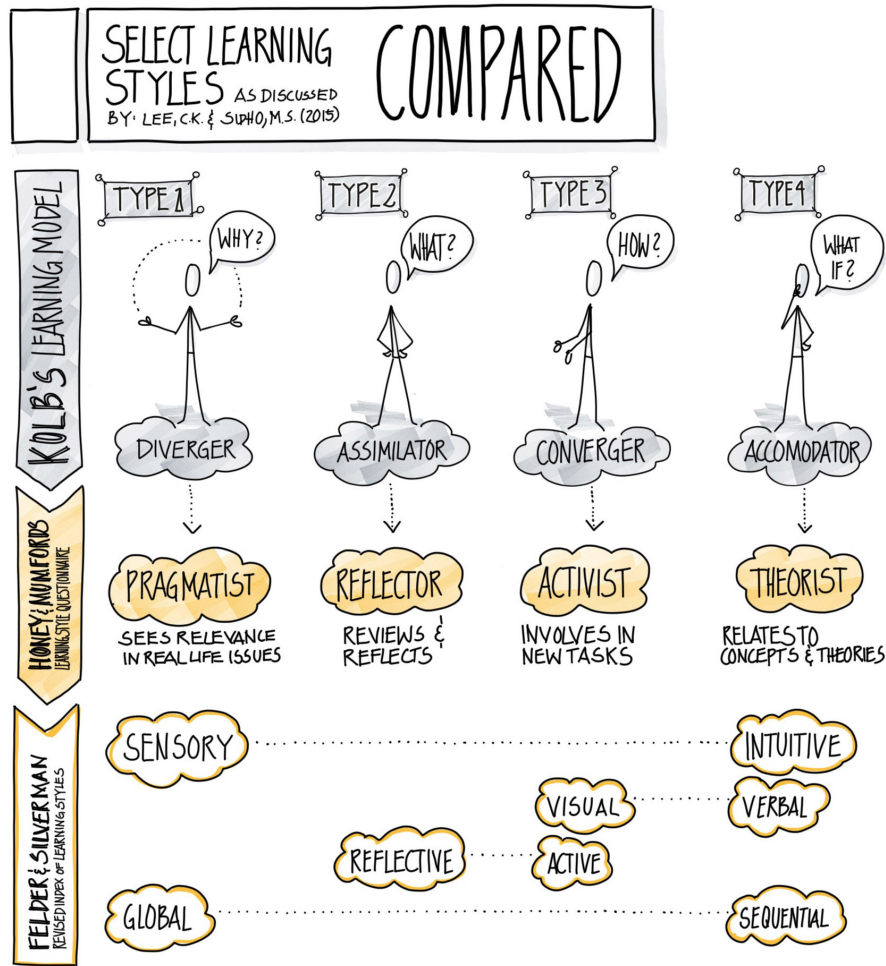


Figure 4. Select learning styles as they relate to one another

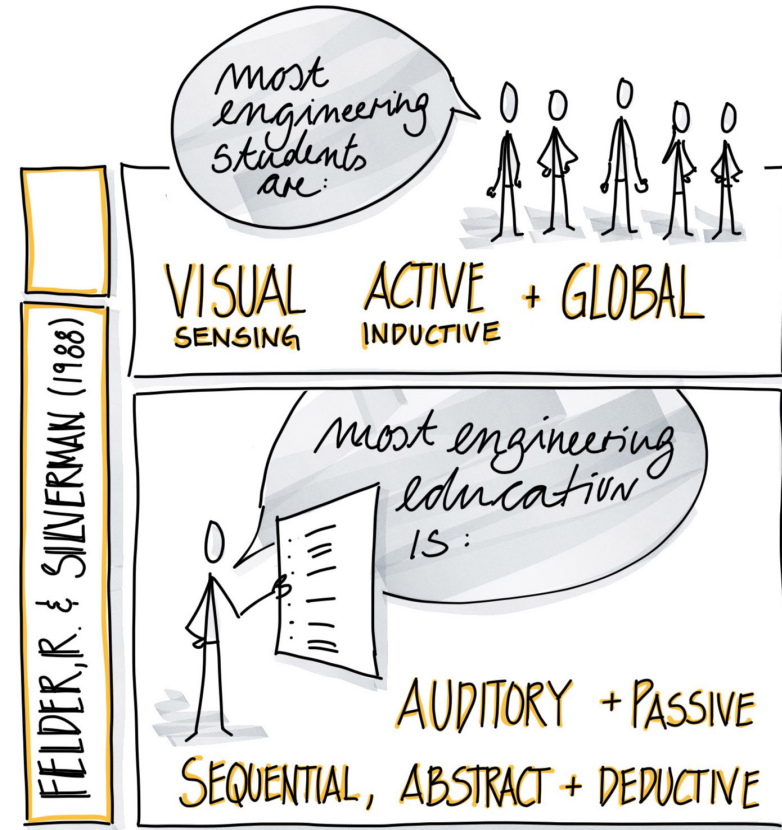


Figure 5. Felder/Silverman learning and teaching styles compared (1988)

3 STUDENT FEEDBACK

Students in both disciplines were introduced to sketchnoting through a 45 minute (electrical engineering) and 1.5 hr (industrial design) hands-on workshop. The survey was conducted 6 weeks after the workshops. The following pages show visual analyses of both surveys.

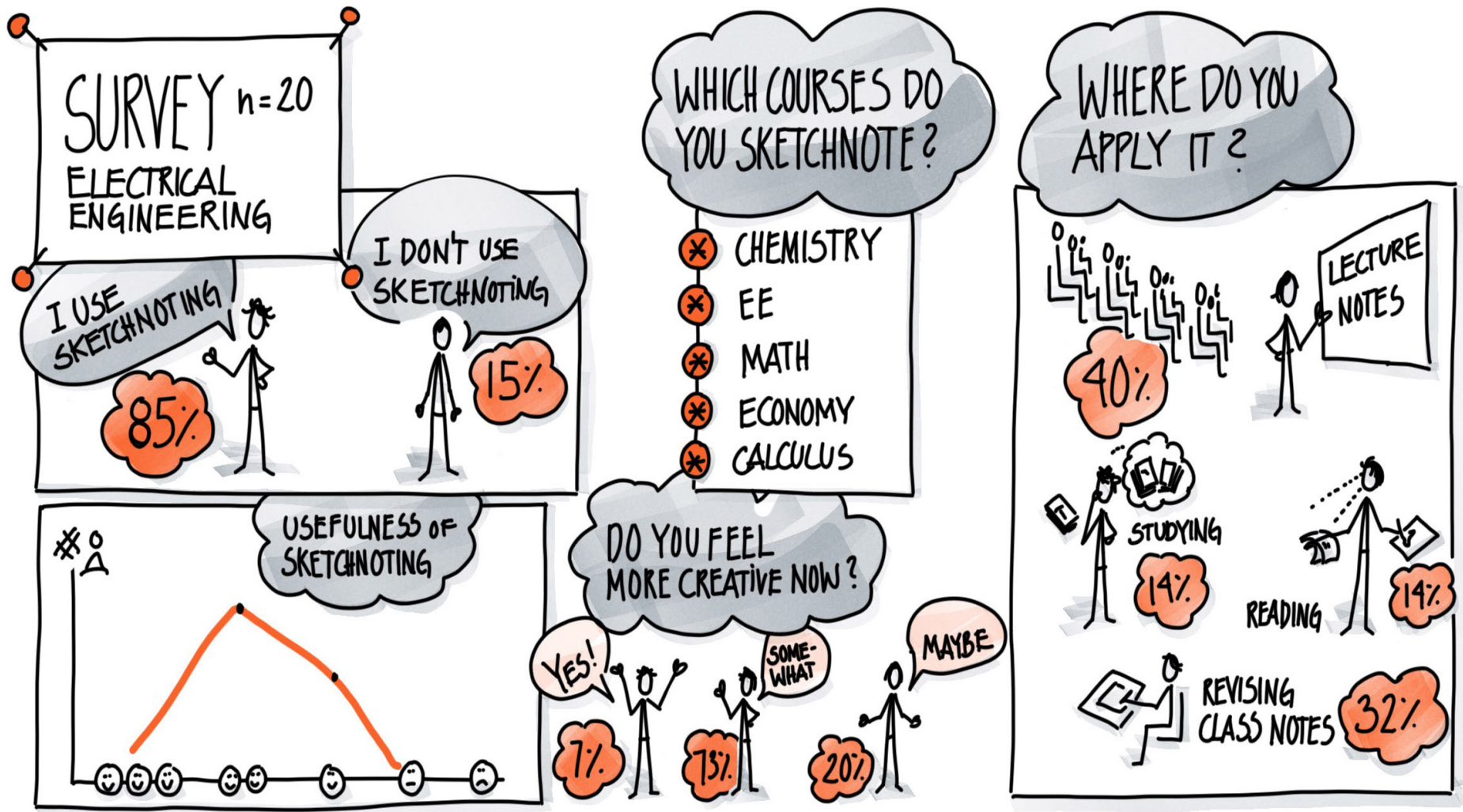


Figure 6. Electrical Engineering survey results

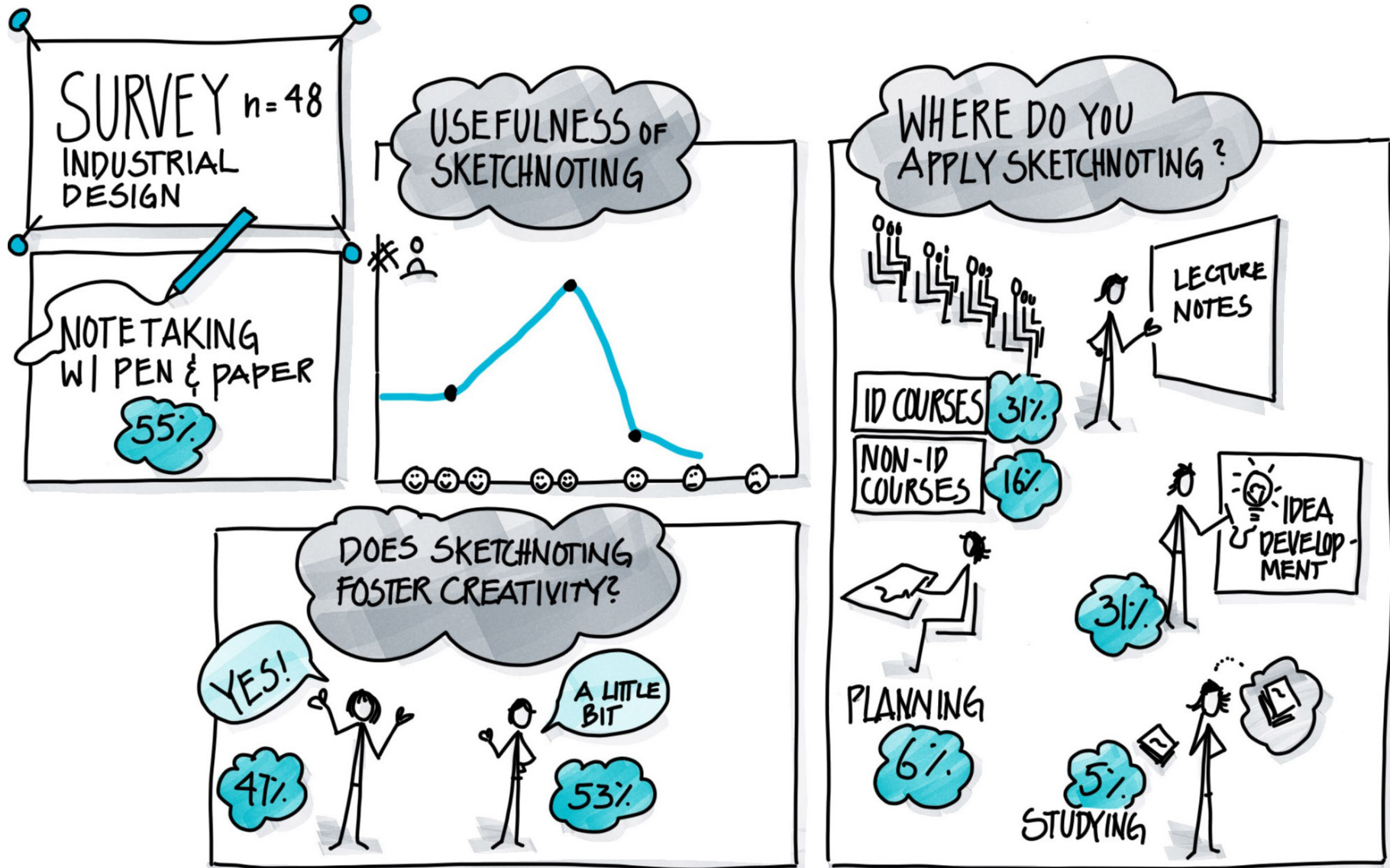


Figure 7. Industrial Design survey results

4 EXAMPLES OF SKETCHNOTING IN ID

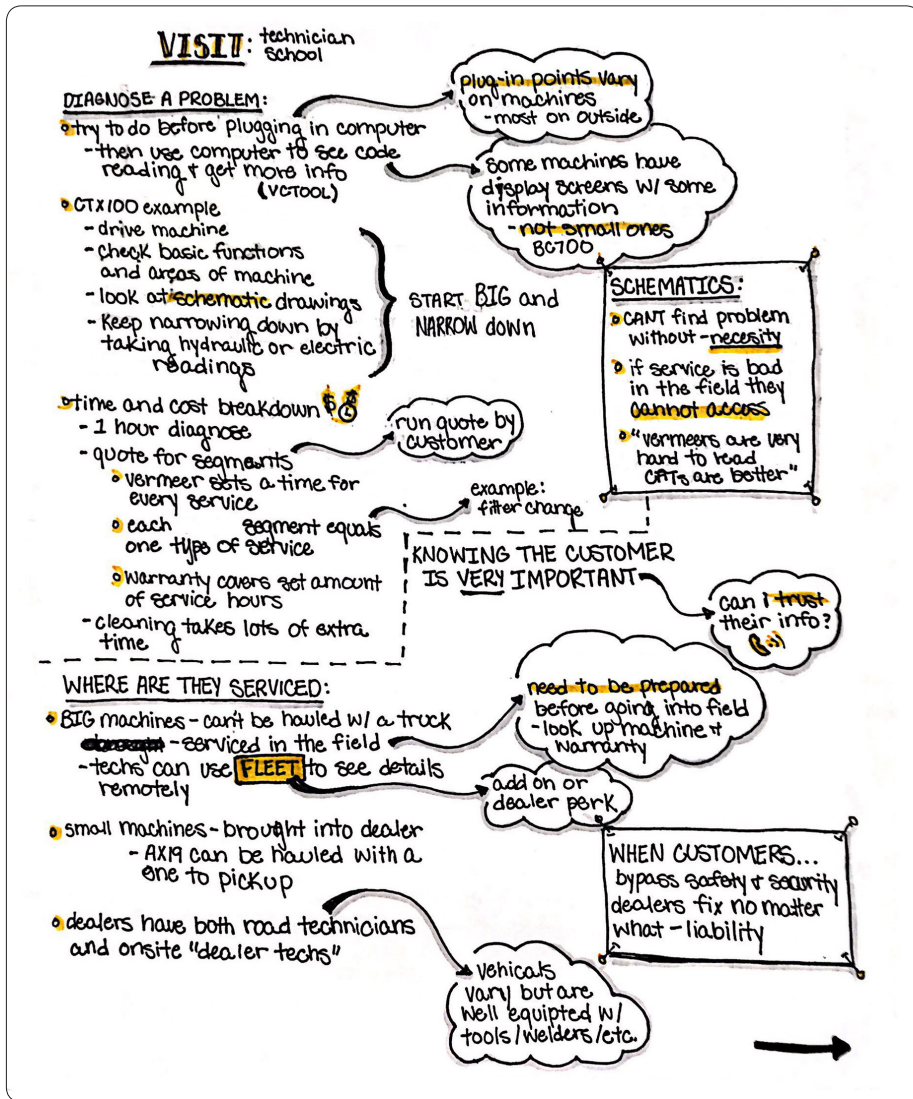


Figure 8. Meeting debrief sketchnote

RECEPTIONIST GUIDE										
ORGANIZED FORMAL STRUCTURE TO ORGANIZE & CARRY-OUT ACTIVITIES	ASK CUSTOMER QUESTIONS	OFFERING TEA	GIVING OPTIONS	CLEAN + SIMPLE DESK	NUMBERING FOOT BATHS	SCHEDULING CUSTOMERS @ CERTAIN TIMES	KNOW WHAT IS GOING ON			
CARING BEING CONCERNED & THOROUGH	ORGANIZED DESK AREA	CHECK LIST	MANUAL W/ EVERY TOPIC IN IT	CONFIDENT	READY FOR THE CUSTOMER	PREPARED FOR WALK-INS	GUIDE ON HOW TO CREATECUSTOMER TYPE	FOOD		
SAFE LITTLE RISK, SECURE	CONFIDENT	GREET	INFORM PPL OF CHRISTINA & MICHELLE'S TRAINING	"CREATE THE SPACE"						
WELCOMING WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING	WARM, POSITIVE GREETING
FAMILIARITY THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING	THOROUGH KNOWLEDGE OF CUSTOMERS, FRESHENING
ACCOMMODATING GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE	GOOD CUSTOMER SERVICE, EAGER TO PLEASE
TRUST WORTHY DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST	DEPENDABLE, HONEST
GENTLE MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT	MODERATE, NOT OVER DOING IT
COMMUNICATIVE CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION	CLEARLY RELAYS NEED INFORMATION

Figure 9. Ideation



Figure 10. Ideation

5 CONCLUSION

Both Industrial Design and Electrical Engineering apply the same sketchnoting building blocks. However, it seems that Electrical Engineering students seem to first build subject matter expertise, then sketch and creative confidence, using

sketchnoting mostly for subject matter comprehension, retention, and planning. Whereas, Industrial Design students move from sketch, to creative confidence to subject matter expertise, using sketchnoting throughout the design process. This study will be continued.

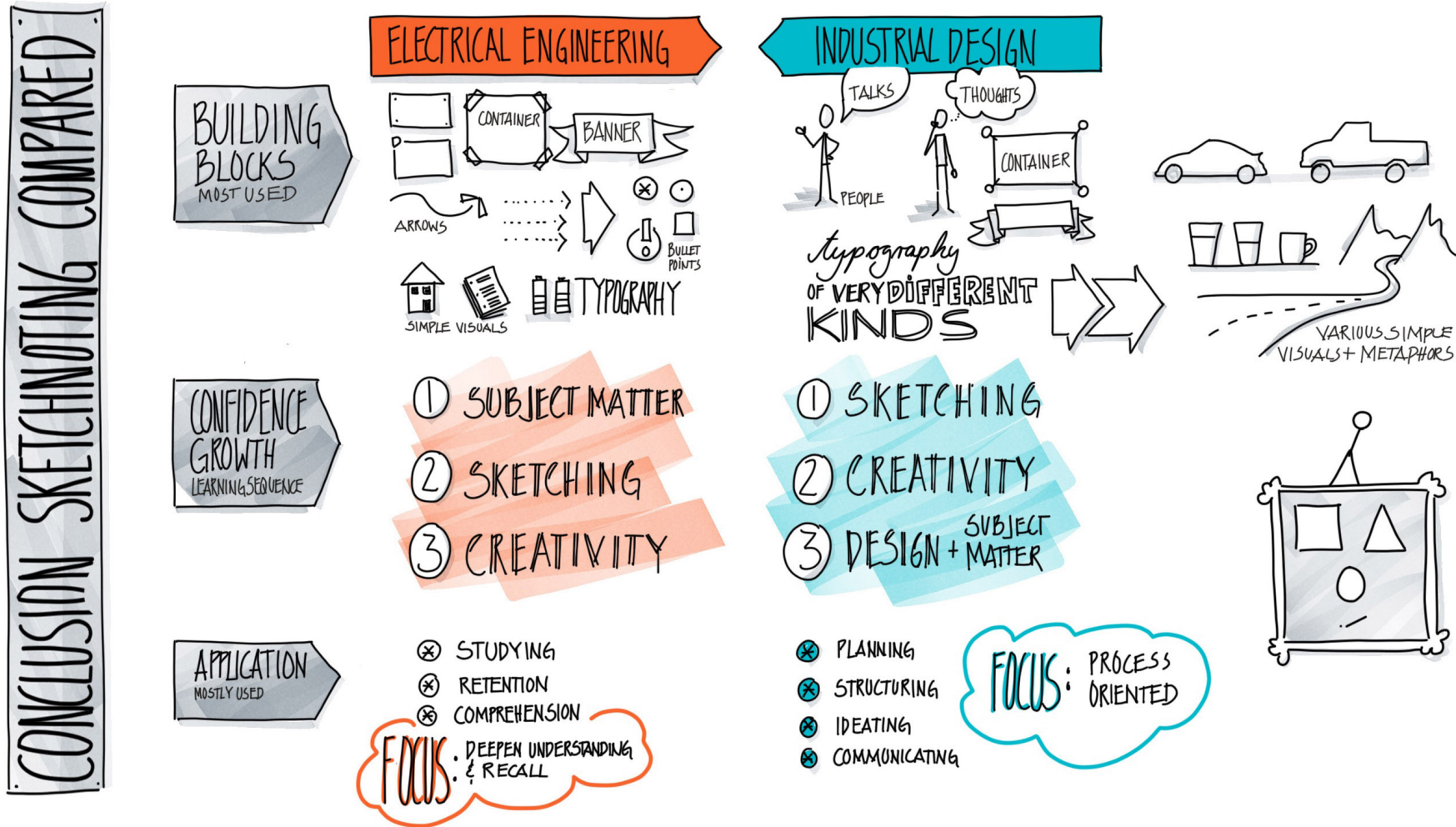


Figure 15. How sketchnoting creates meaning for EE and ID.

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