



GUIDED DISCOVERY LEARNING IN SEMINARS, TUTORIALS AND CAPSTONES

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Introduction

The COVID-19 lockdowns of recent years compelled a shift to remote learning for students, ushering in an era of what can be termed as guided discovery, reminiscent of educational approaches popularized in the sixties. This method, although often ridiculed at its inception, bears resemblance to Jerome Bruner's concept of guided discovery, aimed at fostering both self-mastery and mastery of the material, particularly in reading [3].

Guided discovery, akin to "intellectual orienteering," entails the teacher designing a series of experiences to guide students toward desired learning outcomes. Contrary to a caricatured notion of throwing students into a physics laboratory and expecting them to derive the theory of relativity, guided discovery involves active participation and mentorship [14]. As Bruner himself noted, "Much of what we call 'instruction' is but the provision of an atmosphere in which learning can take place" [3].

While this approach may cover less material in any given timeframe, it emphasizes depth of understanding and student engagement [*cf.* 11]. As John Dewey famously stated, "Education is not preparation for life; education is life itself" [4]. In the post-lockdown era, as schools readjust to in-person learning, there's an opportunity to re-examine the efficacy of guided discovery within the high school setting. This note explores the principles of guided discovery and their potential application in organizing effective seminars, tutorials, and capstone subjects [*cf.* 7,13]. By revisiting these fundamentals, educators may foster deeper learning experiences and better prepare students for academic challenges ahead.

Guided Discovery

Guided discovery, much like its namesake suggests, requires the teacher to act as a mentor, providing students with a mental map marked with signposts to facilitate their active engagement in the learning process. This method prioritizes depth over breadth, allowing students to delve deeply into fewer topics, thus fostering mastery and enjoyment [*cf.* 5].

* These papers are for internal discussion within CESA on topics related to the CESA Mission.

Although mistakes are inherent to the guided discovery process, they are considered valuable learning opportunities, mirroring real-life experiences. Seminars and tutorials, when carefully designed, can serve as ideal settings for guided discovery. Students are presented with problems suited to their level of development and are provided with the resources necessary to collaborate in generating solutions [14].

Despite initial enthusiasm, guided discovery approaches witnessed a decline in popularity in several Australian states due to overestimations of student literacy levels and underestimations of the demands placed on teachers [15]. However, as we navigate the post-COVID educational landscape, there's an opportunity to revive and refine these approaches, leveraging the lessons learned from both the successes and challenges of remote learning.

Seminars and Tutorials:

A seminar can be likened to a group session where participants engage in discussion and debate, typically initiated by a short, focused presentation, usually lasting around 10 minutes. The essence of a seminar lies in active participation and contribution from all attendees, which presupposes prior preparation by both the students and the mentor leading the session [9].

Similarly, a tutorial is not a mini-lecture but rather an academic discussion or debate between a tutor and students. The content and direction of the discussion are typically determined by the students, guided by materials prepared in advance by the tutor. For the tutor, conducting a tutorial is a far more demanding exercise than delivering a lecture, studio session, or laboratory presentation.

In these collaborative learning settings, all participants are expected to prepare beforehand. This preparation might include:

- Formulating an idea for further development,
- Generating two questions that delve into the core of the topic, and
- Crafting three sentences that summarize the salient features of the topic.

Seminar Presentations

At some point during your studies or teaching career, you will likely be called upon to deliver a seminar presentation. The prospect of doing so can be daunting, particularly for those new to the experience. However, adhering to some simple rules and basic principles can help ease the process.

The first step is to clarify your aim, both in your own mind and for the audience. As with any form of communication, having a clear aim is essential. Your aim should be concise, ideally encompassing no more than three points. Without a clear aim, your presentation may lack direction, leaving your audience confused [3].

Consider your audience carefully. What is their background knowledge on the topic? What is the purpose of your presentation in the context of the course or subject matter? If your presentation is part of a summative assessment, be sure to understand how marks will be allocated.

Avoid trying to cover too much in the time available. Like an essay or any other assignment, your presentation should have a clear structure:

- Beginning: Introduce what you aim to demonstrate or explain.
- Middle: Deliver the content.
- End: Summarize your key points.

The format of your presentation may be dictated by your lecturer. Be sure to check any constraints regarding space, time, and equipment. If using visual aids such as PowerPoint slides, ensure they are well-prepared, easy to read, and not overly cluttered.

On the day of your presentation, arrive early to familiarize yourself with the venue and equipment. If presenting via Zoom or Microsoft Teams, ensure you are comfortable with the platform.

Wait for silence before beginning your presentation and maintain eye contact with your audience throughout. Start with an anecdote related to your topic to help ease any nerves. Speak clearly and at a moderate pace, avoiding inappropriate content.

Remember, a seminar is not a mini-lecture. Encourage audience participation by asking questions and providing examples. If asked a question, address the whole audience with your response. Accept constructive criticism graciously, as it is an integral part of professional development.

Consider practicing your presentation with a friend beforehand to receive feedback and boost your confidence. Finally, remember to enjoy yourself!

Prepare a table summarizing your seminar presentation to help you stay on track. Unexpected diversions can occur, but with thorough preparation and a clear aim, your seminar presentation can be both engaging and informative. [2]

Capstone Subjects

Capstone units are particularly appropriate environments for guided discovery, Capstone units seem to be increasing in popularity as a step from undergraduate study into the world of employment. Their assessment with folio reports also seems to enrich the realism, especially in commercial subjects [Figure 1].

Figure 1: Academic work in an industry-sourced capstone unit

ACADEME		INDUSTRY	
Practice	Theory	Practice	Theory
Research Report	Folio Presentation		Project Report

Their subject matter is often provided by an industry link at a level expected of a new graduate. Their development requires a reflection on the recently completed undergraduate subjects, usually through genuine group work where the students learn the elements of that teamwork which is expected in industry [16]. Their level is pitched as a gentle introduction to research [Figure 2].

Figure 2: Six parts of the capstone narrative



A really confronting contribution of the capstone process is to deepen the education of the undergraduate by what it means to strengthen the critical faculty – a distinctive feature of *education* where it differs in range and scope from *training* [Figure 3].

Figure 3: The critical faculty in the capstone report

<ul style="list-style-type: none"> ➤ Excellent explanation of theoretical link between title and topic. ➤ Nature, scope and limitations of the report are clearly formulated. ➤ Candidate obviously understands and appreciates the place of the problem in the general research within the field of discourse. ➤ Prose is crisp and clear, well composed, and the aims are precisely argued.
<ul style="list-style-type: none"> ➤ Well stated connection between report title and the research problem. ➤ Introduction is above average – shows promise. ➤ Candidate understands and appreciates the background to the problem. ➤ Scope and range of the study is reasonably well explained.
<ul style="list-style-type: none"> ➤ Adequately stated connection between report title and the research problem. ➤ Introduction is a conventional attempt. ➤ Candidate understands the background to the problem. ➤ Scope and range of the study is reasonably well explained.
<ul style="list-style-type: none"> ➤ Inadequate connection between report title and the research problem. ➤ Introduction is vague. ➤ Lack of clarity about the background to the problem. ➤ Lack of clarity about the scope of the research in the thesis.
<ul style="list-style-type: none"> ➤ Title and aim of the report do not seem related to the research problem. ➤ Introduction is confusing. ➤ Unclear about the importance of the problem. ➤ The reader is not guided about the structure of the report or thesis.

Concluding Comments

In the hands of an imaginative and creative teacher, the development of a learner's affective domain encompasses a range of essential skills, capacities, and talents. As John Dewey famously stated, "Education is not preparation for life; education is life itself" [4]. These include self-knowledge, self-control, emotional balance, the ability to motivate oneself and others, understanding the sentiments of others, relating effectively with others, maintaining optimism, and demonstrating constancy. Additionally, as Lev Vygotsky emphasized, "A child's greatest achievements are possible in play, achievements that tomorrow will become his basic level of real action" [17].

Furthermore, the acquisition of fundamental reading and writing skills [6,8,18] serves as a cornerstone for personal and professional development. These generic skills not only enrich the academic pursuits of students but also contribute to a unified and enriched personal and professional life.

As educators navigate the post-COVID educational landscape, fostering these skills, capacities, and talents becomes paramount. By embracing principles of guided discovery and leveraging the lessons learned from both successes and challenges in remote learning, educators can create learning environments that not only cultivate academic excellence but also nurture holistic personal and professional growth. As Jerome Bruner stated, "You begin with the possibilities of the material" [3]. With this approach, educators can empower students to become active agents in their own learning journey, preparing them not just for academic success but for life itself.

References and further reading

1. Benson, J.D., W.S. Greaves. (Eds). 1985. *Systematic Perspectives on Discourse*. Norwood, NJ: ABLEX.
2. Bruner, J. S. 1960. *The process of education*. Cambridge, MA: Harvard University Press.
3. Bruner, J. S. 1966. *Toward a theory of instruction*. Cambridge, MA: Harvard University Press.
4. Dewey, John. 1897. "My Pedagogic Creed." *School Journal*. 54: 77-80
5. Dewey, John. 1916. *Democracy and Education*. New York: Macmillan.
6. Estrin, H.A., N. Elliot. 1990. *Technical Writing in the Corporate World*. Los Altos, CA: Crisp Publications.
7. Fitzsimons, Peter. 1998. *Beazley*. Melbourne: Harper Collins.
8. Higham. N.J. 1993. *Handbook of Writing for the Mathematical Sciences*. Philadelphia: SIAM.
9. McEvedy, M.A., G. Packham, P. Smith. 1986. *Studying in Australia: Speaking in Academic Settings*. Melbourne, VIC: Nelson.
10. Mandel, S. 1988. *Technical Presentation Skills*. Menlo Park, CA: Crisp Publications.
11. Maritain, Jacques. 1943. *Education at the Crossroads*. New Haven: Yale University Press.
12. Masterman, J.C. 1975. *On the Chariot Wheel*. Oxford: Oxford University Press.

13. Noer, S.H., P. Gunowibowo and M. Triana. 2020. "Development of guided discovery learning to improve students reflective thinking ability and self-learning." *Journal of Physics: Conference Series*, Vol.1581, 012041. DOI 10.1088/1742-6596/1581/1/012041.
14. Shannon, AG., and L.G. Dale. 1968. *How Hot Is It?* (Junior Secondary Science Project, Green Series 5), Melbourne, VIC: Cheshire. (Reprinted by John Murray Publishers, UK, 1975, 1976)
15. Shannon, A.G. 1969. "The readability of JSSP materials." *Australian Science Teachers' Journal*. 15 (3): 71–74.
16. Viswanathan, Shekar. (2017). "Implementation of Effective Capstone Projects in Undergraduate Manufacturing Design Engineering Program." *American Journal of Engineering Education*. 8(1): 45-60.
17. Vygotsky, L. S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.