Analytical Thinking in Accounting Education: Student Use of the Sustainability Accounting Standards Board (SASB) Navigator Database

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Abstract The objective of this study is to explore accounting students' performance on group project tasks, while using a sustainability accounting database. The research question asked is: What is the students' performance in terms of lower- and higher-level thinking skills at a group homework assignment using the SASB Navigator database? This paper presents examples of student work and an accounting instructor's account of a SASB Navigator group homework project assigned to two of her *Introduction to Financial Accounting* classes in the autumn 2020 term at a public university in the United States. A total of 46 students who had limited (just from classroom lectures) requisite knowledge of sustainability accounting and the SASB participated in the research. The paper uses a small-scale case study method. The theoretical framework used is Bloom's taxonomy. Excerpts from the last five of twelve questions asked of the student groups are used as data. Hand-written notes were taken by the instructor in a notebook during and after the autumn 2020 term, with her impressions on how the students performed at the assignment. The questions asked of students necessitated the use of both lower-order and higher-order thinking skills. The student groups generally displayed satisfactory lower- and higher-order thinking skills. Digitally transforming accounting and business processes should be facilitated by educational projects, such as this.

Keywords Environmental · Social · And governance (ESG) · Sustainability accounting standards board (SASB) · SASB navigator

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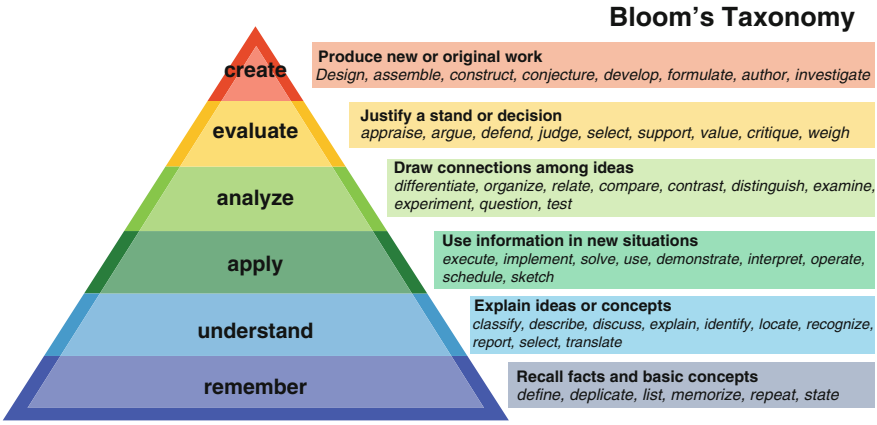


Fig. 1 Bloom's Taxonomy. Source: Bloom's Taxonomy (n.d.)

1 Introduction

Digitally transforming accounting and business processes should start from the classrooms that prepare future accountants and business leaders. Analytical thinking skills are vital for accounting and business students and professionals because these abilities lead to student success and facilitate decision making. Analytical or critical thinking capabilities are among the upper-level skills according to Bloom's taxonomy (Bloom's Taxonomy, n.d.). This taxonomy consists of several skill levels: (1) remembering, (2) understanding, (3) applying, (4) analysing, (5) evaluating, and (6) creating, in ascending order of critical thinking intensity. Figure 1 shows the skills pyramid of Bloom's taxonomy. This research utilises Bloom's taxonomy as its theoretical framework.

2 Background

There are several sustainability reporting frameworks used globally: the Carbon Disclosure Project (CDP), the Climate Disclosure Standards Board (CDSB), the Global Reporting Initiative (GRI), the Science-Based Targets initiative (SBTi), the Task Force on Climate-Related Financial Disclosures (TCFD), the United Nations' (U.N.) Principles for Responsible Investment (PRI), and the World Economic Forum's (WEF) Stakeholder Capitalism Metrics. The SASB framework joins them as a relatively recent framework. Founded in 2011, the SASB is a non-governmental organisation (NGO) issuing industry-related disclosure standards to enterprises on various ESG accounting topics. Whether or not an enterprise participates in the SASB is voluntary. The NGO launched the SASB Navigator database in October 2016. This database "combines financial material sustainability information with

data and analytics to help users understand and analyse industries and companies' sustainability performance and disclosure" (SASB Releases, 2016).

In the context of the SASB Navigator's use in accounting education, Bloom's taxonomy can be insightful to analyse student outcomes. It is important to note that accounting and business education need to transition from lower-order skills (remembering and understanding) to higher-order skills (analysing, evaluating, and creating) since future accounting and business professionals need to be independent thinkers who make important industry decisions based on causality and relevance, among other considerations.

Digitally transforming accounting and business processes is also pertinent to sustainability accounting. This type of accounting has been researched in pedagogical contexts (Boyce et al., 2012; Contrafatto, 2013; Coulson & Thomson, 2006; Owen, 2001; Wong et al., 2021). Kondarevych et al. (2020) discuss Industry 4.0 as the industry that digitally transforms business processes in enterprises. This digital transformation should be addressed in the business and accounting classroom, as well.

3 Aim, Research Question, Research Method, and Delimitations

The aim of this study is to explore accounting students' performance on group project tasks, while using the SASB Navigator database. To our knowledge, very few studies on the student experience with the SASB Navigator database have been conducted (Blaber & Gougoumanova, 2022; Palatnik et al., 2021). The research question asked is: What is the students' performance in terms of lower- and higher-level analytical thinking skills at a group homework assignment using the SASB Navigator database?

This paper uses the case study research method. According to Denscombe (2021), case studies provide an in-depth account of events or processes happening in one instance (in our case, two sections of a university course). Cases exist prior to the research itself and they will continue existing after the study is completed since they happen in their natural environments, argues Denscombe. This author also purports that each case has a clearly defined boundary since it is self-contained. Finally, a case shares typical features with other similar cases; in this study, "other similar cases" are other potential online homework assignments that will use the SASB Navigator. Thus, case studies can examine a particular event or occurrence to make generalisations, Denscombe argues. This paper's data collection method consists of select excerpts from student written work from a group homework assignment—a small-scale case study. This study is qualitative in nature.

As to the case study's delimitations, its major weaknesses are the small student sample size (46 students) and short timeframe (a single university term–autumn 2020). Learners in only two accounting classes were selected for this research since

at the time of the study, the SASB Navigator university licenses were about to expire soon. Future research could include more students from various accounting classes and from different terms to provide a more lucid picture of broader student outcomes on SASB Navigator-based assignments.

4 Teaching Tool

This paper presents examples of student work and an accounting instructor's account of a SASB Navigator database group homework project assigned to two of her *Introduction to Financial Accounting* classes in the autumn 2020 term at a public university in the United States. The paper uses excerpts from the last five of twelve questions asked of the student groups.[1] Hand-written notes were taken by the instructor in a notebook during and after the autumn 2020 term, with her impressions on how the students performed at the assignment. The questions asked of the groups are listed in the appendix. The appendix also provides the instructions given to the student groups by the lecturer.

The first two questions required the use of lower order thinking skills (remembering and understanding), and they were based on following the lecturer's assignment instructions and making observations. For example, Question 1 required students to cite from annual or quarterly reports, and Question 2 was a 'What?' question. Questions 3 and 4 required the use of higher-order thinking skills since they included the word 'Why?' (causation) and since they were based on applying knowledge and analysing and evaluating information. Question 5 was open-ended, and it required giving an opinion. The five questions encouraged following the instructions of the lecturer (easier task) and applying analytical thinking skills (more difficult task).

Forty-six students (22 and 24 per class) who had limited (from classroom lectures) requisite knowledge of sustainability accounting and the SASB were given licenses for the SASB Navigator database. This database provides information on the quality of U.S. SEC's filers' ESG disclosures. The students completed a marked group homework assignment in sixteen groups of one to four students. The groups were assigned a letter from A to P as a group identifier. All groups were composed of three students, except for Groups H, N, and P which were comprised of one, two, and four students, respectively. Toward the end of the term, some groups lost members due to students' withdrawal from the class. Institutional Review Board (IRB) approval was obtained from the University on November 19, 2020.

[1] The first seven of the twelve questions are discussed in Blaber and Gougoumanova (2022).

5 Data Presentation and Analysis

Below are some of the groups' responses to the last five questions of the homework assignment (here, they are numbered Questions 1 to 5).

Question 1: Please provide some excerpts from your chosen non-U.S. company's U.S. SEC filings (Hint: Click on the blue "Excerpts" button on the left; these are excerpts from the company's SEC filings–annual report (Form 10-K), quarterly report (Form 10-Q), etc.).

The groups selected different companies. Group B for example chose the Japanese Toyota Motor Co. This group wrote (Please see Image 1): **Image 1:**

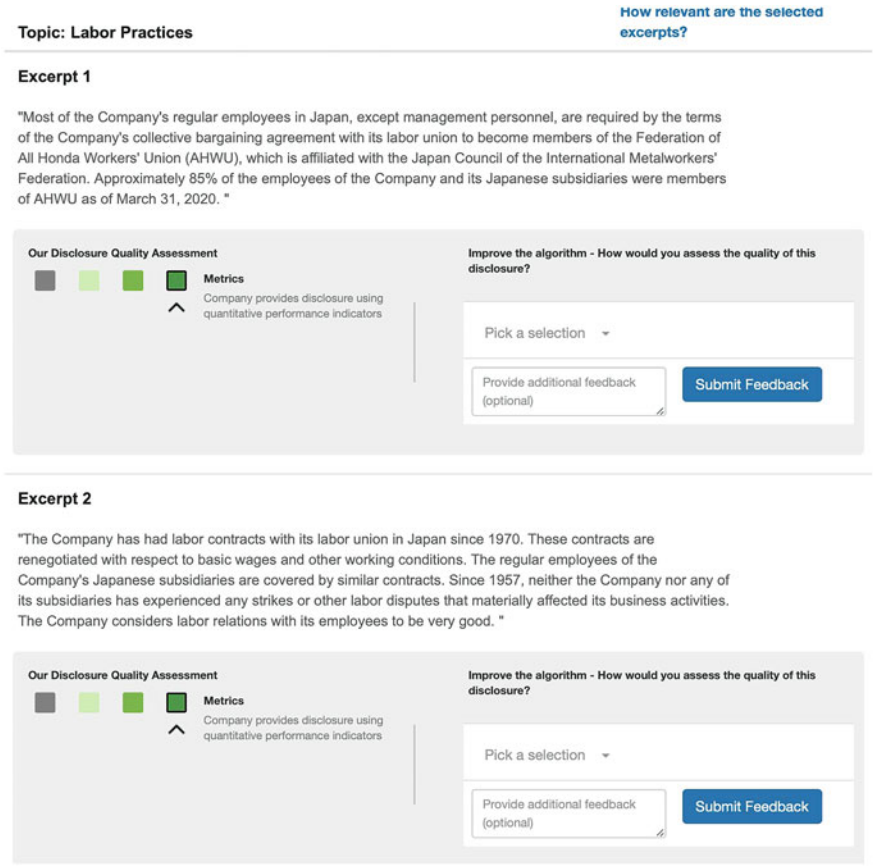
Excerpt 1

"In addressing environmental issues based on an assessment of the environmental impact of its products through their entire life cycles, from production through sales, disposal and recycling, Toyota as a manufacturer, strives to take all possible measures from development stage and continues to work towards technological innovations to make efficient use of resources and to reduce the burden on the environment."

Excerpt 2

"In Japan, basic wages and other working conditions are negotiated annually. In addition, in accordance with Japanese national custom, each employee is also paid a semi-annual bonus. Bonuses are negotiated at the time of wage negotiations and are based on Toyota's financial results, prospects and other factors. The average wage increase for all union members, excluding bonuses, in Japan was approximately 2.39% in fiscal 2020."

Group E who chose another Japanese company, Honda Motor Co., provided the following excerpts (Please see Image 2): **Image 2:**



The four excerpts in Images 1 and 2 above are indeed about the environmental and social disclosures of U.S. SEC filers. Students from these and other groups showed a tendency to follow closely the lecturer's instructions by providing relevant excerpts from the SASB Navigator. Question 1 required the use of a lower-level thinking skill according to Bloom's taxonomy–understanding and applying knowledge.

Question 2: What is the quality of the company's sustainability disclosures? (Hint: According to the legend on the upper right-hand side of most database images, dark green is the highest quality disclosure (numeric/metrics/quantitative), light green is company-tailored narrative (non-numeric/qualitative/a lower quality of disclosure), and grey is no disclosure at all.).

Group H who selected Sony wrote: "For 2019 the only information available is Product Security and the disclosure quality is Boilerplate and the rest is no disclosure."

Group E shared:

Disclosure intelligence ranks a company's disclosure quality based on if it uses quantitative performance, company tailored narrative, boilerplate (which is generic language), and finally no disclosure. As we can see Honda is pretty good at disclosing information based on labour practices, and product safety but fails to mention information such as material sourcing, material efficiency and fuel economy and emissions.

Group B (Toyota Motor Co.) wrote:

Labor Practices has the highest quality of sustainability disclosures. Followed by that is Product Safety. However, the quality quickly decreases with Fuel Economy and Use-Phase Emissions as the quantitative variables decrease greatly between the disclosures. Materials Efficiency and Recycling doesn't have the most quantitative variables, but because it has more grey area and less quantitative variables, it has a lower quality. The lowest quality is Materials Sourcing. It has the most grey area and holds no qualitative variables.

Generally, the groups provided satisfactory answers to Question 2. This question was observation- and understanding-based, and it did not require the use of advanced analytical thinking skills. The groups mentioned "quantitative" disclosures, "Boilerplate" disclosures, and "non-disclosures," as prompted by the colour scheme of the SASB Navigator.

Question 3: Do you think that sustainability disclosures should be treated as equally important to investors, creditors, and the public as financial disclosures (such as the financial statements)? Why or why not?

Group J (Honda Motor Co.) noted: "Yes, we think that the sustainability disclosures should all be treated equally because it would provide investors and other market participants better and more information to all companies yearly reports."

Group P wrote:

This is really critical to your investors, creditors, and the public as essential information that should be consumed by the public and financial contributors. These sustainability disclosures do things such as measuring performance and setting attainable goals. Think of the information that is kept away from the public and their investors, they should be treated similarly, with full transparency. These financial reports are the source of information that people understand and feel safe about investing in the organization.

Contrary to Groups J and P, Group B shared:

Not at all. While they should all be taken into account for investors, creditors, and the public, they should have individual weights. For instance, Labor Practices would fluctuate very infrequently by comparison to Fuel Economy and Use-Phase Emissions or Materials Sourcing. So, by this logic, Labor Practices would have less of a weight in the overall effect on the financial standings of the corporation.

In addition, Group E wrote:

I think sustainability disclosures should be treated as almost important as financial reports. I think financial reports are a very great indicator of how a company is doing financially and usually it is easy to tell whether or not a company is going to succeed or not based on their financial conditions. As we see with Honda Motors Company, they did not score well on their sustainability disclosures, and we see their

revenue based on their income statement as decreasing. I believe financial and sustainability reports go hand in hand with each other and if Honda does not move towards electric vehicles, we might see their revenue decrease by even more over the years.

	Fiscal years ended March 31,		
	2018	2019	2020
	Yen (billions)		
Motorcycle Business	¥ 2,038.7	¥ 2,100.1	¥ 2,059.3
Automobile Business	10,852.1	11,072.1	9,959.0
Financial Services Business	2,123.1	2,365.3	2,586.9
Life Creation and Other Businesses	347.0	350.9	325.6
Total	¥ 15,361.1	¥ 15,888.6	¥ 14,931.0

As we can see their automobile revenue has decreased more than other revenue.

Group H shared:

Yes, I think sustainability disclosures should be treated as equally important to investors, creditors, and the public. I believe that it will only benefit a company if they are more transparent. When a company is transparent, it builds trust which benefits the company by increasing business transactions and relationships. The sustainability disclosures will also help investors improve their investment and voting decisions because they will be looking at the business through different perspective beyond the financial lens. I believe that the public should have access to the social and environmental impacts that comes from producing the company's good and services too as that can directly impact people's lives.

Based on the examples of student work above, most groups agreed that sustainability disclosures needed to be treated as equally important as financial disclosures. Group B disagreed and argued: "Not at all." The critical thinking question: "Why or why not?" was not always clearly answered, but the answers revolved around providing more information to interested parties for decision making and building trust. Group H gave the following reason for the equal importance: "I believe that it will only benefit a company if they are more transparent." Overall, the quality of the English language (grammar and style) was not very satisfactory, a fact that obscured the clarity of the answers to the "Why or why not?" question.

Question 4: How did you like the SASB Navigator? Why?

Group H wrote: "I enjoyed using the SASB Navigator. I like the different information that you can look up such as financials, different services and consumer goods. You can see which companies disclose their information and how transparent they are."

Group E shared:

I enjoyed the SASB navigator because it offers tons of information on a company's financial position as well as their goals and plans for the future. It was very interesting to look at a company as big as Honda and see huge numbers in their financial statements. I also was not familiar with sustainability accounting and learned a lot while exploring the SASB Navigator.

Group B noted:

It was easy to use after a little while. However, everything is compact. For instance, when asking for excerpts from the SEC filing, the first instinct was to go

to the SEC Filing. However, this was a Form 20-F, rather than 10-K or 10-Q. Also, a lot of the companies did not have disclosures available. So, it was difficult to search for a company that offered what was needed.

Group J wrote:

We all had a good experience with using the SASB navigator because the organized database was set up for us to navigate through. We learned more important things about investing and the different market standards that can help us further in this field.

Group P shared:

The Sustainability Accounting Standards Board navigator was a very eye-opening experience that I have not really had with any type of platform. You get see what these non-profit organizations are all about. This platform showed full transparency within its group or organization. Personally, I have not used this database ever on campus, but I am glad I was introduced to it.

The answers to Question 4 displayed the fact that the students had a positive experience, while using the SASB Navigator. The learners liked the fact that they saw "huge numbers" and that they became introduced to sustainability accounting and to the International Financial Reporting Standards' (IFRS) Form 20-F. Group P wrote that the companies included in the SASB Navigator were "non-profit organizations," a fact that is not true. The companies included there are for-profit, publicly traded corporations in the U.S.

Question 5: Anything else you would like to share about your work with the SASB Navigator?

Group B wrote:

It wasn't until after the SEC question was complete that it was realized where the SEC Filings were. So, the company that was originally chosen was changed to Toyota Motor. However, had this been caught previously, the company would have been Forward Pharma A/S, Denmark.

Group H noted: "The SABS Navigator organizes different information about different companies well. I like how you can find the companies based on their sector and industry and how the disclosures are divided by topics."

Group J wrote: "My group members and I had a good experience with using this database for the first time and thought it was interesting to see the different disclosures."

Group P elaborated:

The SASB is a great tool because it gives graphs and statistics about not just about the organization that you are looking at, it gives contrast to similar organizations and why they are unique in their own way. The disclosures are also given the opportunity for people that are navigating through the database to examen the organization and view the positive and negative information about the company, which helps individuals choose if they are interested in the company or not.

Two groups did not provide an answer to Question 5. The four answers to this question provided above showed that the students reiterated that they had a positive experience using the SASB Navigator. The answers to Question 5 were similar to the answers to Question 4. Group B acknowledged the fact that they had not seen the

location of the U.S. SEC filings of their chosen enterprise, and that they had changed companies because of this omission. Group P made some spelling mistakes (e.g., "examen") and used long sentences; but overall, they appreciated the fact that the SASB Navigator compared and contrasted companies from the same sectors and industries.

6 Discussion and Conclusion

The research question asked in this paper was: What is the students' performance in terms of lower- and higher-level thinking skills at a group homework assignment using the SASB Navigator database? The outputs of the group assignment discussed above (select groups' answers to Questions 1 to 5) showed that students generally displayed satisfactory to the instructor lower- and upper-level thinking skills. Satisfactory student performance is a subjective concept; however, in most cases, student work met the instructor's expectations of undergraduate students' grasp of sustainability accounting topics and command of English grammar and style. Mostly, students followed the lecturer's written instructions from the appendix. Nevertheless, there were some missing answers to questions. This study filled the gap in the accounting and business education literature related to the SASB Navigator's usage by students. Building on Blaber and Gougoumanova (2022) and Palatnik et al. (2021), this study shed some light on Bloom's taxonomy of lower- and higher-order thinking skills in the context of sustainability accounting pedagogy.

The students in this study used a new accounting information systems tool–the SASB Navigator–and they learned about ESG reporting quality. The instructor had lectured on sustainability accounting and reporting in class prior to this homework assignment; thus, students had some prior knowledge of the topics discussed. Besides, by having to choose a non-U.S. company traded on a U.S. stock exchange (the NYSE or the NASDAQ), the learners expanded their international perspectives. Digitally transforming accounting and business processes in an international context should be facilitated by educational projects, such as this. The authors encourage accounting and business educators to implement SASB Navigator-based student projects in their classrooms since this database provides a sneak peek at what future accountants and businesspeople are working with at the workplace. A possible student SASB Navigator assignment would be to create ("Create" is the highest level of Bloom's taxonomy.) an ESG disclosure framework of their own. This new ESG framework may borrow elements from existing ESG frameworks, including the SASB's. Using the SASB Navigator in the classroom benefits not only students, but also universities–it helps maintain business school accreditation by proving to the accreditation body that students have been exposed to cutting-edge technologies and hands-on experiential learning.

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