

Training Critical Thinking Skills: The 6SA Method

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Introduction

How can you teach critical thinking skills? Faced with this question, we designed the 6SA method for the course “Corporate Sustainability” (Prof. Volker Hoffmann) at D-MTEC. In the following, we explain the method, share our experience, and provide hands-on material to help you try the method in your own teaching.

The key idea of the six sentence argument (6SA) is that *writing is thinking*. Formulating an argument that is easy to follow and convincing requires critical thinking. Once formulated, such an argument also documents the reasoning process and makes critical thinking visible, and thus accessible to teaching.

The 6SA method allows students to practice critical thinking by formulating an argument that follows a pre-defined structure of six sentences. The structure makes transparent how the argument works and makes it easy to assess in an anonymous peer review. Using this method, students engage with the lecture content by developing their own position, they learn to support their position with convincing arguments, and they become critical readers through reviewing their peers’ arguments.

Method overview

The method has five phases that are shown in the figure below and described in detail in the following sections.



1 Case Analysis

In the first phase, students are presented with a case. The case is built on the lecture content and presents a decision-making scenario where students need to take a position or suggest one action from two or more viable alternatives. As in real life, there is not one correct answer, but there is sufficient information that allows students to apply their knowledge from the lecture and their critical thinking to find the position that they feel is right and that they are comfortable with arguing for. The case also clearly spells out the situation of the writer and the addressee of the argument, in order to embed the exercise in a realistic context.

2 Write: The Structure of a 6SA Text

In the second phase, students write a 6SA text. Each 6SA text is a mini-essay of six sentences that conveys one argument. No sentence may be longer than twenty words. Each sentence fulfills a specific function within the whole argument.

#1 Introduction

The **introduction** presents the topic of the text. It guides the reader to a specific situation and sets the horizon of positions that one might take in this situation.

#2 Position

In the **position**, the author states the argument's claim. The position is where the author can freely choose a stance within the horizon that is given by the introduction and the case description.

#3 Reason

The author presents a **supportive reason** that supports the stated position. Given that the author can only present one supportive reason, the author needs to choose that supportive reason which is most valid and important.

#4 Challenge

In the **challenge**, the author addresses potential reservations that a critical reader might have concerning the supportive reason. This is an opportunity to safeguard the overall argument against expected criticism.

#5 Rebuttal

The **rebuttal** answers to the challenge, for example by limiting the position to certain cases. The purpose of the rebuttal is to inform the reader that the author has already identified and weighed the pros and cons of the position.

#6 Conclusion

The **conclusion** sums up the argument and clearly states the judgment or decision reached by the author's reasoning. Its purpose is to convince the audience, and it should be short, memorable, and to the point.

3 Review: The Grading Criteria of a 6SA Text

In the review phase, students assess and grade the 6SA texts of two of their peers. At the same time, they receive a peer review from two fellow students on their own text. Reviewers are asked to be friendly and constructive in their reviews, and to justify their assessment with precise commentary.

The assessment is guided by seven grading criteria – one for every sentence plus one for formality. On each of the six sentences, they have to decide if the sentence fulfills its structural function within the argument. If it does, one point is given. If one point is awarded, students have to decide how well the sentence fulfills its particular function to award a second point. The seventh criterion assesses whether the text respects grammar and spelling conventions. The highest score for a 6SA text is 14 points.

6SA	Criteria for Assessment As a reviewer, assume the role of the person that is addressed with this text in the case!
#1 Introduction	<ol style="list-style-type: none"> 1. The introduction states the topic of the argument. Can you answer: What is the argument about? 2. The introduction attracts the reader's attention in the context of the case. Can you answer: Why should I read this?
#2 Position	<ol style="list-style-type: none"> 1. The position fits to the argument's introduction (#1) Is the position within the horizon of the introduction? (#1) 2. Explicitly identifies the actors and objects in the context of the case. Is it clear, who is supposed to do what?
#3 Reason	<ol style="list-style-type: none"> 1. The reason explains why the position (#2) is reasonable. Do you understand why someone might share this position? 2. The reason is plausible in the context of the case. Do you accept this reason? If not, why not?
#4 Challenge	<ol style="list-style-type: none"> 1. The challenge addresses one point of criticism concerning the supportive reason (#3). Does the anticipated criticism really apply to the supportive reason? 2. The challenge identifies the most central weakness of the supportive reason in the context of the case. Can you find a more relevant weakness? If yes, which one?
#5 Rebuttal	<ol style="list-style-type: none"> 1. The rebuttal states a response that refutes or qualifies the anticipated criticism (#4). Does the rebuttal apply to the anticipated criticism? 2. The rebuttal is plausible in the context of the case. Do you accept the rebuttal as sufficient to dismiss the criticism (#4)? If not, why not?
#6 Conclusion	<ol style="list-style-type: none"> 1. Summarizes the argument on the basis of previously presented information (#1 - #5). Does the conclusion exclusively rely on aforementioned information? 2. The conclusion reinforces the position and emphasizes its relevance in the context of the case. Do you feel that the conclusion motivates you to follow the author's advice?
Formality	<ol style="list-style-type: none"> 1. 1 point (correct number of sentences and all sentences within 20 word limit) 2. 2 points (maximum 1 spelling or grammar mistake)

4 Reflect: Peer Review and in-class Feedback

In phase four, students reflect on their work by considering the two peer reviews they received as well as by comparing their “solution” to those of others.

Every student receives two peer reviews that assess the argument in detail, specifying where and why points may have been deducted. The two peer reviews may or may not come to the same result, in either case they present an opportunity for the author to judge with some distance, whether the argument was well crafted. If two peer reviews differ drastically, the relevant 6SA and its reviews should be reassessed by the lecturer.

In addition, students receive a general feedback in class that provides them with context on how they argued in relation to their peers. The overview presents the different positions and suggested actions from all 6SAs. It introduces the lecturer’s additional comments on the students’ texts to guide thinking onto a higher level of reflection about the case. It illustrates good examples of 6SAs and of reviewers’ comments to give students orientation on how to improve their writing and their reviews. It is critical to remind students to be gentle and precise when they write reviews, in order to avoid frustration.

5 Improve: Individual Learning Effects

Phase 5 concerns the overall learning progress that is achieved by repeating the 6SA method several times. Over the course of the semester, we offer five e-modules to the students. The first e-module is a general introduction to the critical thinking exercise and counts as a training ground. In four subsequent content-based e-modules, students can engage with the lecture material and with their peers to improve their critical thinking skills step by step.

In the course of the semester, students make four case analyses, write four 6SA texts, conduct eight anonymous reviews – two in every e-module - and receive eight peer reviews for their own 6SA texts. In addition, they receive four in-class feedbacks. A great strength of the method is that every student can start from his individual level and improve with every round. In addition, the cohort as a whole gets more experience, so the overall niveau of the texts and of the reviews become more precise throughout the semester. The student’s learning effect benefits from the repetitive exposure to critical readers who are familiar with the author’s challenge of writing a concise and convincing argument.

Implementation Schedule

- Overall, we conducted the 6SA method in a weekly rhythm, in sync with the weekly lecture slot.
- The case was presented in an e-module that is accessible after the lecture and allows students to recollect their key learnings from the session.
- The writing phase began with the presentation of the case, and gave students 4 days to submit a 6SA.
- The review phase opened after the deadline of submissions had passed. In the moodle workshop module, the texts are automatically made anonymous and are allocated to two reviewers. The deadline for submission is one day before the next session. This gave us time to check for drastically diverging reviews and to prepare the in-class feedback.
- The in-class feedback was given one week after the case presentation and usually took about 10min at the end of the lecture. Alternatively, the reflections can be sent out via email to students.

In addition, we informed students that the final exam integrates one 6SA text to incentivize them to become familiar with the method. Furthermore, students can replace 10% of their exam grade with their e-module grade if their e-module score is better than their exam score.

Examples of student feedbacks:

In an online survey, we asked students about their experience with the 6SA writing exercise:

- Doing it right takes too much time. I honestly think that it would have been less painstaking with slightly looser regulations on the word count (for example, a total of 132 words instead of 120).
- I liked to see other 6SA and learn about other people's ideas. Doing peer reviews helped me to understand the structure of a 6SA better so that the next time I wrote one, it was a bit easier.

Examples of a 6SA question from the lecture

Case:

Shell is one of the major oil companies, active in the exploration and production of oil, as well as in the refining and distribution of petrochemical products, such as gasoline and diesel. Recently, Shell has expanded its activities into the production of biofuels. In 2011, Shell opened its "Raizen" plant in Brazil, a refinery that produces ethanol from sugar cane. Ethanol can be blended into existing fuels, it is cost competitive with regular gasoline, and currently contributes about 10% to the gasoline supply of the United States.

However, ethanol based on sugarcane is a so-called first generation biofuel, meaning that it is produced from edible raw materials, such as sugarcane, corn and wheat, as well as rapeseed and soy. In recent years, serious concerns have been voiced about the impact of large-scale production of first generation biofuels. Critics say that first generation biofuels compete with the production of food, which leads to high prices and food shortage in some countries, accelerates global deforestation and puts additional pressure on water resources. In addition, it is controversial whether biofuels that are derived from intensive farming have in fact lower carbon dioxide emissions over their life cycle than fossil fuels.

Shell is therefore thinking about investments into second-generation biofuels. Second-generation biofuels are derived from agricultural waste products, and other non-food materials such as grass and timber. Research suggests that large quantities of these inputs can be produced without competing for land with food production and forests. Yet as of 2015, second generation biofuels had production costs of \$5 per gallon, which is two to three times the cost of regular gasoline.

The high cost of second-generation biofuels is accompanied by considerable technological uncertainty. There is not only a variety of potential base materials for second generation biofuels, but also a great number of different production methods. Different thermochemical processes as well as biochemical approaches using microorganisms are under investigation, and it is not yet clear which production method will perform best in the future. The field is strongly dominated by start-ups that possess considerable knowledge on specific solutions. Shell itself possesses very little experience in the production of second generation biofuels.

6SA question

In terms of organizational setup, how do you advise Shell to approach an investment into second generation biofuels? Internal R&D, a technology alliance, or acquisition of another company? Structure your answer in the 6SA format.

Exemplary student reply

- #1 Shell cannot produce second-generation biofuels at low cost and is thinking about investments to improve the technology.
- #2 I advise the company to acquire several start-ups specialized in different production methods to bring the necessary knowledge to Shell.
- #3 Since Shell has little competences in this field, these acquisitions would allow Shell to catch up rapidly and produce cheaper.
- #4 There is considerable technological uncertainty related to the efficiency of different production methods and potential base materials.
- #5 However, by acquiring several start-ups using different approaches, the different groups could compete until the best method is found.
- #6 Therefore, I recommend to select a panel of start-ups using various materials and methods and make a deal with them.

Additional examples of 6SA texts on different writing assignments**Example 2**

- #1 Critical Thinking Skills are of increasing relevance for today's students who need training instructions and coaching to develop these skills.
- #2 Our 6SA method trains students in case analysis, clear reasoning and writing, giving supportive peer reviews, and guided reflections.
- #3 The method applies "writing is thinking" and lets students gain experience as writers to become expert reviewers for their peers.
- #4 Critics may question the training effect because drafting 6 sentences with max. 20 words each only emphasizes style over content.
- #5 However, the formalized style forces students to clarify their reasoning and lets critical readers assess the quality of an argument.
- #6 The 6SA method enables students to personally engage with knowledge and help each other to master the art of argumentation.

Example 3

- #1: 6000 letters from the Rainforest Rescue Campaign were delivered to me, requesting us to stop buying palm oil from Wilmar.
- #2: This serious situation needs prompt reaction from our company, which should consist in suspending our cooperation with Wilmar.
- #3: Wilmar's behavior in Nigeria strongly endangers the environment and continuing dealing with them, will not comply with our sustainability plan.
- #4: Problems in our palm oil supply chain will be a temporal consequence as Wilmar is our main palm oil supplier.
- #5: Nevertheless, the economical consequences will be less harmful than the ones arising from the bad reputation of continuing the cooperation.
- #6: Therefore, I suggest an immediate cut-off from Wilmar's palm oil and an urgent meeting with the board of Wilmar.