Report on the implementation of Rbutr in the course 'Ethics, Culture and Biotechnology'

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Introduction

This report will give an overview of two debate sessions part of the bachelor course 'Ethics, Culture and Biotechnology' that is part of the minor Responsible Innovation and that is accessible for students from the TU Delft and Leiden University. This report will especially focus on the use of the online plugin Rbutr that students worked with for the debate sessions, which is a tool that connects the webpage one is looking at to a critical response to it. So, when one reads one webpage Rbutr could suggest one or more webpages showing a different perspective on the same subject. The aim of Rbutr is to fight misinformation online and to stimulate people to asses online sources critically by showing them multiple viewpoints at the same time. By letting the students in this course work with Rbutr, we hope to see whether the tool could increase their ability to reflect critically on online sources and thereby to develop a more nuanced stance on the subjects that are central in this course than would be the case with traditional academic research. Next to analysing the exact implementation of Rbutr by the students, this report will thus map the extent to which the tool affects students' critical thinking and debating skills.

Structure of the debate sessions

This report will specifically focus on two debate sessions part of the course that took place on respectively 30 November 2017 and 7 December 2017. Each debate session was structured around one discussion question, drawing upon recent biotechnological developments. The first debate session was built around the question "Is it Ethical to Patent or Copyright Genes, Embryos or Their Parts?". The second session revolved around the question "Human Enhancement: Do We Have an Obligation to Make Smarter Babies?". For both debate sessions the whole group of 37 students was split into a morning group (group 1) of 18 students and an afternoon group (group 2) of 19 students. Each group was subdivided again in three groups; two debating groups and one jury group. The groups were randomly chosen in order for the students to step out of their own initial response and to develop a more thought out stance.

For each debate session all the groups had to read two articles, presenting opposite points of view on the topic at stake. The two debating groups were each assigned one of the perspectives presented in the texts. They had to present these viewpoints during the debate session in order to convince the jury, the instructors and the opposite team about the rightfulness of their case. They were free to use PowerPoint and any other instructive supports for the defense of the text. The

groups were also asked to enrich their arguments with insights/ arguments from other sources. They had to write down these additional references in their PowerPoint file. During the debate sessions, first each group debated in solo, not in conversation with the other group. After the two presentations, the two groups had to debate with each other. Therefore, the jury group was asked to take ten minutes to prepare two to five critical questions to enable a fruitful discussion. At the end of each session, the jury came up with a verdict of which group had won the debate. They were asked to support their choice with clear arguments.

The use of Rbutr

In order to map the extent to which Rbutr could contribute to students' critical thinking and debating skills, enabling them to form a nuanced stance on the subject, we first asked the afternoon group to find additional sources by using rbutr, and the morning group to do this by looking for sources by more traditional means – such as searching for articles in the university library. For the second debate session we reversed this; we asked the morning group to work with Rbutr and the afternoon group to work according to more traditional academic methods. This has allowed us to compare students working with Rbutr to students working according to traditional forms of research. This enabled us to detect potential differences in argumentation and ability to develop and articulate a well informed and balanced viewpoint on the subject at hand.

Analysis of debate sessions

I will give an analysis of each debate by giving an overview of the topic of the debate sessions, the different texts students had to read, which group defended which article and which group took the role of jury upon them. The aim of this overview is not to give a detailed outline of the subject matter of the debates or to give an in-depth analysis of the articles discussed during the sessions, but rather to map the structure of the debates and the rhetorical skills and reading comprehension the students demonstrated. I will thus limit myself to the overall set-up of the sessions. I will do this by discussing per session and per group (1) what side each group argued for, (2) the number of arguments in total, (3) how well researched arguments are (appropriate referencing and wide range of sources), (4) the argument balance of each group, (5) whether or not the group made use of Rbutr and if so how they implemented the tool in their presentation, (6) readability scores, and (7) what the prior belief of the students was.*

* *The readability scores of the texts and sources used by the students have been added as an addendum to this document. The prior beliefs of the students are not incorporated in the analysis*

below as only an extremely small part of the group contributed both their prior and final stances on the debating subjects. Therefore it was not possible to map a potential shift in the students' convictions.

Debate Session 1

The first Debate Session, that took place on 30 November 2017, revolved around the question "Is it Ethical to Patent or Copyright Genes, Embryos or Their Parts?". For this session all the students had to read texts by two authors: chapter 5 and 8 from the book *Who Owns You: The Corporate Gold Rush to Patent Your Genes* by David Koepsell[i] and the article 'DNA patents and human dignity' by David B. Resnik.[ii] The texts by Koepsell argue against the main question of this debate session. The article by Resnik presents arguments in favor of this question.

Group 1

For this debate the morning group (group 1) was divided into three groups: 1a, 1b and 1c. Group 1a was asked to defend the viewpoint of Koepsell, group 1b was asked to defend the viewpoint of Resnik and group 1c had the role of the jury. The morning group did not work with Rbutr during this debate session.

Group 1a consisted of six students of which four presented their arguments. The group used a pdf-file in which they listed their arguments. The group provided four arguments, with small subdivisions within their arguments. The main pillars of their arguments were: law, business, and ethical perspectives. By doing so, they have provided a perspective on the subject of human patenting from multiple angles. By using these exact pillars they echoed the structure of Koepsell's texts, which shows that the group has read the texts closely while preparing the presentation. Next to the arguments Koepsell presents in his texts, the group introduced other sources to support their main argument: an artwork and four articles that they retrieved from the internet themselves. On these extra sources they based two extra arguments in support of Koepsell's viewpoint. All the sources used by the group were referenced in the pdf-file of their presentation. The arguments presented by the group were thus well researched and well referenced. However, the group did not introduce an opposite view, which they refuted to strengthen their argument. The arguments presented in their presentation were therefore not very balanced.

A nice addition to this group's presentation was that they incorporated a possible shift in the students' opinions on the subject by presenting an online quiz in Kahoot!.[iii] This quiz incorporated five questions that were asked to the whole group at the start of the presentation. Students had to raise their hands to show they were positive, negative or neutral towards the question. At the end of

the presentation the same questions were asked again. Only one person's stance had changed from positive to negative. The rest of the students' opinions remained unchanged. Although this quiz was hardly able to show the effect of additional sources and information on students' views – as all the students had already read both authors in preparation for this class – it shows the group's awareness of the possibility that opinions can change with an increase in knowledge on the subject at hand and with an increase in exposure to different perspectives on this subject.

Group 1b consisted of six people of which three gave the presentation. The group presented their arguments in a PowerPoint file. They introduced three arguments to defend the viewpoint of Resnik. These arguments were discussed in Resnik's text as well, which shows that the group has meticulously studied this text while setting up their presentation. The arguments presented in their presentation were explained very clearly. The students thereby demonstrated that they had a good understanding of the text. Next to Resnik's article, the group presented a Youtube resource at the start of their presentation. However, this clip did not support the main argument provided by the group, but seemed to be an illustration of the broader topic of the debate. No other sources were discussed during the presentation. The arguments provided by this group were thus not elaborately researched and the sources they used were not clearly referenced. The group did mention that further research on the topic would be necessary to come to a more definite conclusion. Apart from this nuance, the argumentation of this presentation was not very balanced as only one source was discussed.

Group 1c was formed by six people. All of them prepared a question on the debating topic beforehand and during a ten minute break after the two presentations. These questions were directed towards further explanation of the arguments presented by both groups. They also posed a few critical questions about subjects both groups did not incorporate in their plea. These questions forced the students to sharpen their argumentation. This led to a fruitful debate in which both group 1a and group 1b could respond to opposite points of view. Group 1a succeeded best in refuting the opposite arguments of group 1b. This showed the coherence and clarity of their plea. The argument balance of this group's presentation thereby increased during this interactive debate. Group 1b was more hesitant in its argumentation. The jury felt they could have highlighted the negative sides to the subject a little more. For this reason, group 1c elected group 1a as the winner of the debate.

Group 2
The afternoon group (group 2) was equally divided into three groups: 2a, 2b and 2c. Group 2a was asked to defend the viewpoint of Koepsell, group 2b was asked to defend the viewpoint of Resnik

and group 2c had the role of the jury. The afternoon group was asked to work *with* Rbutr while preparing for this debate session.

Group 2a presented in favor of Koepsell's point of view. The group was formed by six people of which two gave the presentation. They used a pdf-file to present their arguments. They provided six main arguments, which were presented in a logical and concise manner regarding their stance. They embedded their argumentation in the broader context around the subject of human patenting, through which their plea was very convincing. This also demonstrated the students' ability to identify the different layers in Koepsell's texts. Thereby they showed a very good understanding of this text. During their presentation, the group mentioned two additional studies to support their reasoning. These extra sources were not clearly referenced in their presentation. The arguments provided by the group were thus well researched but not well referenced. The group was asked to make use of Rbutr, but did not clearly show how they implemented the tool in their presentation. However, the documents they sent to the instructors afterwards showed that the additional sources used by the group were retrieved from Rbutr. These sources, however, did not provide an opposite point of view, but enforced the group's main arguments. Because the group did not introduce any counter-arguments, their argumentation was not very balanced.

Group 2b consisted of seven people of which two gave the presentation. This group gave three arguments to defend their position. These arguments were directly based on the text by Resnik. The students mentioned this very clearly in their presentation. They presented these arguments in the form of a storyline. Their argumentation was thereby very persuasive and convincing, but the arguments were not as clearly explained as was the case with group 2a. The group did not use any additional sources to enrich their plea. Although the group was asked to make use of Rbutr, they did not seem to have implemented the tool in their presentation. As they based all of their arguments on Resnik's article, their plea remained one-sided and was not very balanced.

Group 2c consisted of six people who together formed the jury of the debate session. Three people in this group actively prepared questions beforehand. During a ten minute break, after the two presentations, the rest of the group formulated more questions. Most of the questions were dedicated to clarify the arguments provided by both groups. With more critical questions, the jury attempted to force the students to elaborate and substantiate their argumentation in more detail. This led to an active debate in which group 2a and 2b could respond to each other's arguments. During this debate group 2b was able to control the direction of the debate because of their persuasive debating style. They avoided the central debate by assuming answers to fundamental questions, and went on increasingly detailed tangents. Group 2a tried to get the discussion back on track, but despite their more varied and researched arguments they fell short compared to the

rhetorical strength of group 2b. In the end, the jury elected group 2a as the winner of the debate. According to the jury, they presented clear arguments in the presentation, and cited sources other than the assigned reading during the debate. Group 2b was more successful at creating a convincing narrative supporting their arguments and at controlling the direction of the debate, but they did not reference sources and derailed the debate from the actual focus.

Comparison between group 1 and group 2

The debate sessions of group 1 (the morning group) and group 2 (the afternoon group) were very different. Group 1 behaved very calm, had a well-structured debate and touched upon the core elements of the topic at stake. Group 2, on the other hand, gave more in-depth presentations and held more convincing pleas compared to the first group, but had a more unfocused interactive debate in which the discussion shifted to increasingly minor details. Although group 2 was asked to make use of the Rbutr plugin while preparing the discussion session, only one presentation group – group 2a – actually did this. This group had more varied arguments, but did not introduce any counter-arguments by which their plea remained one-sided and was less nuanced than it could have been. The main aim of Rbutr, namely to stimulate people to asses online sources critically and thereby to develop more nuanced stances, thus has not been demonstrated here. This becomes even more apparent as the group that used the most wide-ranging sources – group 1a – did not work with Rbutr at all. It is therefore difficult to compare the group that has worked with Rbutr to the group that did not as the differences between the groups seem to lie more with the group dynamics than with the methods they used for preparing their argumentation.

Debate Session 2

The second Debate Session, that took place on 7 December 2017, revolved around the question "Do We Have an Obligation to Make Smarter Babies?". For this session all the students had to read two texts with opposite points of view on the topic: chapter 6 and 9 from the book *Our posthuman future: Consequences of the biotechnology revolution* by Francis Fukuyama[iv] and the article 'Human genetic enhancements: a transhumanist perspective' by Nick Bostrom.[v] The texts by Fukuyama provide arguments against the subject of this debate session. The article by Bostrom presents arguments in favor of the topic.

Group 1

For this debate the morning group (group 1) was again divided into three groups: 1a, 1b and 1c. The composition of the groups remained the same during both debate sessions. This time group 1b was

asked to defend the viewpoint of Fukuyama, group 1c was asked to defend the viewpoint of Bostrom and group 1a had the role of the jury. The morning group was asked to prepare this debate session by working *with* Rbutr.

Group 1b presented their main arguments in a PowerPoint file. Three students performed the presentation. The group presented four arguments, each dedicated to a specific concern; a historical concern, a religious concern, a utilitarian concern and the concern about human dignity. Thereby the argumentation of group 2b was structured in accordance with the two texts by Fukuyama. Through this means, the students showed a basic understanding of the core arguments presented in these text. Next to Fukuyama's texts, the group introduced one other source in order to elaborate an insight provided by Plato's philosophy. However, they did not reference this source in their PowerPoint or in their written presentation. It thus remains unclear where this source comes from. The group was asked to prepare their presentation by retrieving additional sources via Rbutr. But, they did not show whether they actually made use of the tool for this presentation. The arguments articulated by the group were thus not extensively researched and, apart from the texts by Fukuyama, the sources they used were not well referenced. Because the students mainly stuck to the insights provided by Fukuyama's text, their argumentation was not very nuanced and their plea not very balanced.

Group 1c based their argumentation on the perspective of Nick Bostrom. Two students from this group gave the presentation. This group equally made use of a PowerPoint file to present their arguments. They incorporated six arguments to defend their position in favor of the debating topic. The group presented their arguments in a concise and comprehensible way. They thereby showed that they had a very good understanding of the different elements discussed in the article. The group implemented Rbutr in their presentation as they made use of additional sources they retrieved via the Rbutr plugin. They listed these resources clearly in their PowerPoint file. It can thus be stated that the group's arguments were well researched and clearly referenced. These extra sources allowed the group to introduce two opposite arguments that they refuted to strengthen their argumentation. Because group 1c presented viewpoints from Bostrom's paper, as well as from other texts with opposite views their argumentation can be described as balanced and nuanced.

`   **Group 1a** played the role of the jury during this debate session. They were given ten minutes to prepare a maximum of five discussion questions. Because they came up with only two basic questions, the instructors posed critical questions themselves. This opened up a debate between group 1b and 1c in which they could respond to each other's arguments. Because group 1c was familiar with possible counter-arguments against their position, they succeeded in refuting almost

every argument brought forward by group 1b. The jury eventually elected group 1c as the winner of the debate as group 1b was unable to sufficiently defend their arguments.

Group 2

The afternoon group (group 2) was also again divided into three groups: 2a, 2b and 2c. The composition of the groups has remained the same throughout the two debate sessions for group 2 as well. Group 2b was asked to defend the viewpoint of Fukuyama, group 2c was asked to defend the viewpoint of Bostrom and group 2a had the role of the jury. The afternoon group did not have to work with Rbutr.

Group 2b presented their plea by using a PowerPoint file. They provided four arguments that were built around four concerns – as was the case with group 1b: history, religion, utility and human dignity. This echoed the structure of Fukuyama's text. The students in this group thereby demonstrated a basic comprehension of the text. Next to Fukuyama's texts, the group made use of an insight provided by Nietzsche's thinking. Furthermore, they showed an artwork to convince us of their position, but this work eventually turned out to be a vague illustration of the subject at stake. The work therefore did not contribute to their main arguments. The group did not reference their additional sources. The argumentation of the students was thus not very well researched and their sources were not clearly listed in their presentation. Because the group mainly presented Fukuyama's point of view, their presentation did not provide a well-balanced point of view.

Group 2c presented six arguments to defend their position. They used a PowerPoint presentation to do this. Two students presented the group's arguments in an extremely coherent and clear way. They showed that they more than fully grasped the subject of the debate. They were therefore able to give multiple examples and cases to support their main arguments. The students constantly showed quotes by Bostrom and took these as the basis for each of their arguments. Next to Bostrom's paper, they incorporated other sources in their presentation which gave a different perspective on the subject. The group listed these sources at the end of their presentation. Their arguments were thus very well researched and clearly referenced. Based on their additional sources, the group was able to introduce counter-arguments, which they refuted in order to strengthen their position. This made their argumentation very convincing, nuanced and balanced.

Group 2a formed the jury of this debate. During a ten minute break after the two presentations, they were given the time to prepare some discussion questions. The jury did a very good job at moderating the debate. During the debate group 2c started off very convincing, but they turned out to be unable to further substantiate their argumentation as they stuck too much to the pragmatic side of their arguments. This gave group 2b the chance to pose critical questions

concerning the possible challenges posed by technologies of human enhancement. Although group 2c was able to refute the counter-arguments provided by group 2b, they did not succeed in tackling the core issues of the subject at stake. The rhetorical skills of group 2c allowed them to stand their ground during the interactive debate. However, the issues brought forward by group 2b steered the debate back to its fundamentals. Based on the substantive contribution of 2b, the jury elected them as the winners of the debate.

Comparison between group 1 and group 2

During the second debate session, there seemed to be less difference between group 1 and group 2. Both groups had one debating group that did very well (group 1c and group 2c); these groups introduced multiple resources and presented a great variety of arguments – including counter-arguments they refuted to strengthen their plea. The other groups demonstrated a basic understanding of the texts they had to defend, but they did not discuss opposite viewpoints in their presentation. Furthermore, these groups mainly stuck to only one resource which made their argumentation one-sided and less comprehensive than the plea of the other groups. It could be stated that the high quality of the arguments provided by group 1c has to do with their use of Rbutr. However, it is difficult to see a causal relationship between this group's argumentation and their use of the tool as it was mostly one group member who spoke up and led the debate. It thus remains the question whether the group was able to develop their arguments by working with Rbutr, or whether they were led by the qualities and pre-existing knowledge of one of their group members. Moreover, while the argumentation of group 2c equally contained a great variety of perspectives, they did not work with Rbutr at all. This further challenges the initial impression that there could be a correlation between the use of Rbutr and the quality of the arguments presented.

Conclusion

It turned out to be difficult to analyse the implementation of Rbutr by students and to map extent to which Rbutr affects students' critical thinking and debating skills. This mostly has to do with the fact that many students did not clearly show whether they actually used the tool for their presentation. The students often did not reference the sources they used or they did not search for additional sources at all. Only one group (group 1c during the second debate session) clearly introduced sources retrieved via Rbutr. Although the argumentation of this group was very comprehensive, well-balanced and nuanced, it remains difficult to see whether the group was able to develop these high-quality arguments by working with Rbutr, or whether they were led by the qualities and pre-existing knowledge of one of their group members – who mostly led the debate.

A possible explanation for the students not searching for additional literature with Rbutr – or through more traditional academic methods – could be that they had their hands full on getting familiar with the topics of the two debate sessions. These subjects are very complex and difficult to get to grips with. Especially as most of the students participating in this course are educated in exact sciences. They were therefore unfamiliar with the methods, values and thought processes part of the humanities perspective around which this course was build. Both the subjects and the methods used to discuss them thus formed a challenge for the students. This might have left them with less room for exploring another new resource, namely the Rbutr-plugin. A possible solution to this could be to incorporate one or two classes in a next course in which learning to work with Rbutr would be the main aim.

Lastly, the goal of the two discussion sessions part of the course 'Ethics, Culture and Biotechnology' already included the development of a nuanced stance of the topics at stake. The assigned literature that students had to read in preparation for the sessions therefore contained multiple insights in the debate around the subjects and thus provided a quite balanced viewpoint already. The added value of Rbutr providing multiple perspectives at the same time therefore did not live up to its potential in this specific context.

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[i] Koepsell, D. (2009). *Who Owns You: The Corporate Gold Rush to Patent Your Genes.* John Wiley & Sons. Chapter 5 & chapter 8.

[ii] Resnik, D. B. (2001). DNA patents and human dignity. *The Journal of Law, Medicine & Ethics*, 29(1), 152-165.

[iii] Kahoot! is a free game-based learning platform for teachers of and learners. To goal is to play, learn and have fun together in the classroom. Website: https://kahoot.com/.

[iv] Fukuyama, F. (2002). *Our posthuman future: Consequences of the biotechnology revolution.* Macmillan. Chapter 6 and Chapter 9.

[v] Bostrom, N. (2003). Human genetic enhancements: a transhumanist perspective. *The Journal of Value Inquiry*, 37(4), 493-506.