Introducing Argumentation at Higher Education in Pakistan
A New Paradigm of Teaching Ethic based Topics

Fayyaz Ahmad Faize

COMSATS Institute of Information Technology, Islamabad

While argumentation as a teaching method has gained extensive popularity in the West during last few decades, it has not gained the required attention in Pakistan. The present research is an attempt to introduce this method in Pakistan and to experiment with its effectiveness in a course with ethic related topics. An undergraduate class of bioscience at a large public sector university was taken as the control group. The students were guided to identify elements of an argument, take a position on an issue, justify claim with evidence and present counter arguments. The written argumentation reports of the students were analyzed using Ground Competency-Argument Pattern. The paper will highlight the strategies undertaken by the researcher for conducting argumentation. The progression of argumentation skill by students was also monitored with time. The effectiveness of the intervention was measured through comparison with a control group analyzed via 't' test. The views of the students about argumentation were also collected through a questionnaire. The students expressed their liking for argumentation method which helped in making informed decisions, ensured active involvement during lesson and greater conceptual understanding.

Key words: argumentation, ethic teaching, higher education, performance,

Ethics is related to making informed decisions about right and wrong (Kaliman & Grillo, 1993). The advancement in science and technology and the growing needs of society has invited a multitude of ethic related issues and problems (Ramos, de Pires, Brehmer, Gelbcke, Schmoeller & Lorenzetti, 2013; ten Have, 2006; Rotblat, 2000). The responsibility on educational institutions and professionals has multiplied asking for intensive commitment to find solutions to these ethical problems (Vanlaere & Gastmans, 2007; Wong, 1995).

UNESCO also started its organized effort in the same direction through various declarations and its advisory body, The World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) that was set up in 1998. The 32nd UNESCO General Conference (2003) urged the member states to introduce and promote ethic education in their educational institutions. The COMEST report on the teaching of ethics (2003) also stressed upon the universities and other professional institutions to introduce ethic teaching as an elementary subject as well as an advanced course leading towards a degree in ethics. The purpose of including ethic in education is to develop individual capacity for mutual co-existence, to exhibit socially and morally accepted conduct, exchange of good practices and meaningful learning (Martínez, Bruxarrais & Esteban, 2002). It is intended to motivate scholars, instructors and managers to maintain a high degree of ethical standards in their work and research (Samadi & Mahdavikhou, 2009). Attending to UNESCO's call, universities and other higher educational institutions took up the task and introduced ethics as a separate subject and included ethic related topics in different science and social science courses. However, how to make the teaching of ethics more effective and interesting was another challenge.

Usually, ethics is taught through the traditional lecture method. This is a simple method and is deemed suitable for knowledge acquisition (Colliver, 2000). It is an economical method that helps in covering more course content in a given time. However, teaching through this method for a lengthy duration can result in boredom and sleep inducing behavior (Dhaliwal, 2007). Another method in ethic teaching is group discussion in which the topic is given to the students and their views are explored by the teacher. This approach encourages student interaction and wider understanding of an issue (Rathnakar, 2011). Medical instructors often use role-play and students assume an actor's position to learn about an issue. It creates interest and is an active learning technique. Interestingly, Noone, Sharma, Khan, Raviraj & Shobhana (2013) found that role play was effective in teaching ethics to medical students however, there was no significant difference between students taught through lecture method and through role play and both the methods were equally good in ethic teaching.

Another method is to divide the class into groups and allotting a separate topic to each group related to ethics. Each group then makes a presentation of the topic to the class using a variety of techniques such as role-play (Wong, 1995).

Teaching ethics through story-telling is another effective method. This sharing of experiences can be under-taken by the teacher and/or students and it articulates and justifies a position with reflection on various other alternatives to solving ethical problem. The students are requested to listen to each other attentively, patiently and respect individual

differences to make moral choices and improve social affiliation (Bowman, 1995).

Another method of ethics teaching is argumentation which is increasingly used in science education and science teaching in recent decades (Driver, Newton & Osborne, 2000; Osborne, Erduran & Simon, 2004). Overall, however this approach has received minimal attention in the literature. The present study explores the possibility, applicability and effectiveness of argumentation method in ethics teaching as it is believed to have potential for considerable contributions.

Argumentation is found to be more effective in improving students' conceptual understanding (Nussbaum & Sinatra, 2003; Osborne, Simon, Christodoulou, Howell-Richardson & Richardson, 2013), inculcating critical skills (Zohar, 2008; Kaya, 2013) and making informed decisions (van Gelder, Bissett & Cumming, 2004). Argumentation is different from what the term 'argue' implies which is characterized by confrontation. Arguing occurs with an individual or a target group. However, there is no target individual or group in class argumentation as each student or group presents their viewpoint neutrally without targeting individuals. Moreover, argumentation is addressed to a larger audience for information and learning purposes (Nussbaum, 2002).

Argumentation is a discursive process of making a claim, providing evidence for supporting claim and critiquing alternatives (Osborne & Patterson, 2011). It is based on Toulmin (1958) argumentation model and according to this approach; a quality argument is composed of six components: claim, data, warrant, qualifier, backing and rebuttal with the number of components determining the quality of an argument. The more the components, the higher the quality. However, beside Toulmin's model, other models are also used for analyzing the quality of argument. Accordingly, due to complex nature of various components in Toulmin (1958) model, the researcher in this study utilized a simpler model for analyzing the quality of an argument. This model was more appropriate for the context. Students in Pakistan are mostly familiar with the lecture method with discussion method and group activity being very rare (Iqbal, 2004). Therefore, the researcher used Grounds Competency-Argument Pattern (GC-AP) in the present research to determine the quality of argumentation. The GC-AP combines data, warrant and backing into a single component (Osborne et al., 2004). Thus, GC-AP has 3 main components, claim, grounds and rebuttal. Claim is the choice or decision made by an individual. Ground includes the data for the support of the claim and may contain examples and detail description. Rebuttal is the most important indicator of argument quality and it refers to condition or situation under which the person may change his/her claim indicating high order thinking skills (Lin & Mintzes, 2010). It also includes counter arguments. The students' argument is divided into six patterns. Pattern 1 is the lowest and 6 is the highest. However, the researcher used GG-AP with a slight

modification and set five argumentation patterns to make analysis simpler and usable in classes with weak background information of discussion and argumentation. The scheme for the argumentation pattern and its components is provided in the data analysis section in detail.

Method

i. Training Sessions

In order to enable the students to understand and use argumentation, the researcher conducted two training sessions each of 1.5 hour duration with an undergraduate class of bio-science 3rd semester students at a large public sector university in Islamabad. The class was comprised of 38 students, 30 females and 8 males. The researcher sought students' views on whether they were involved in discussion approaches by the other subject teachers. The students' denied of being taught with modern teaching methods. Some teachers use white board to deliver their lecture while very few use computer presentation to clarify new concepts. The computer presentations sometimes involved diagrams, animations and video clips, which the students found interesting. It was reported that the subject teachers asked questions during the lesson but did not create discussion sessions.

The students were introduced to argumentation, its structure and its use in learning process with the researcher making use of various examples and references to clarify the argumentation components. For evaluating whether students had understood the argumentation process, the class was given some ethical topics and argumentation was invited. The argumentation session was observed through a checklist and it was found that the students were able to conduct argumentation without inviting any opposition or embarrassment. The students were asked to follow guidelines while conducting argumentation. These are detailed below:

i. While discussing a topic through argumentation, follow the GC-AP framework.
ii. Listen patiently to argument made by other students and do not interfere in between
iii. Respect the views of the opposing group
iv. Give your counter-argument in a polite manner keeping in mind the GC-AP framework.

ii. Instructional Strategies

Ethics as a separate subject was not offered by the university; however, various ethics based topics are included in the curricula of various subjects. The researcher made a list of all ethic-related topics from the course on Pakistan Studies such as ethnic and religious conflicts, terrorism, population planning, environmental degradation, nuclear proliferation, cultural diversity and corruption. The researcher then asked the class to prioritize (by majority vote) the sequence of topics to be learned during the term. This activity served two major purposes. Firstly, because of student familiarity with the topics they were mainly sorted

from simple to complex and from familiar to non-familiar. Secondly, the process implied that students would select on the basis of having prior background knowledge which would make argumentation more viable.

To conduct argumentation in the class, the following procedure was adopted.

a) The students were divided into small groups of 3 or 4 members
b) The researcher writes the topic for argumentation on the board and the students were asked to discuss the topic in their group for 10 minutes
c) After discussion, the students could write an argumentation individually or collectively as a group, taking 5 minutes
d) The group would then present their argumentation before the class, mindful of the necessary components of argumentation. The time allocated for this activity was 30 minutes.
e) After all groups' argumentation, the final comments and concluding remarks are given by the teacher with the help of students.

Written Argumentation Reports

The students were guided on how to write a good argument with all its necessary components. The course required 32 classes each of 1½ hours duration. The semester duration was 16 weeks and the course had two classes per week. One period per week was reserved for argumentation session and the other period for necessary course work to cover the syllabus, to take regular quizzes, follow up on the assignment etc. The argumentation activity was undertaken for 10 weeks though not consecutive covering 10 major ethic related topics. For each topic, the students were asked to write arguments according to the argumentation pattern after discussion in their group. The researcher would collect the written arguments at the end of each lesson. The written arguments served as a mean for analyzing quality and progression in argumentation.

Semester Exam Marks

For comparing the effectiveness of the intervention strategy, the performance of the experimental group was measured on the semester exam at the end of the semester. This performance was then compared with performance of a control group in the same course with same exam paper. The number of students in the control group was 28 registered in the same course. The control group was taught via the traditional lecture method. The exam papers were marked with a pre-defined marking key in order to avoid bias in marking.

Questionnaire

A questionnaire with open-ended items was also distributed to the experimental class at the end of the semester. The questionnaire asked for students' response on argumentation and their experience with this new methodology.

Data Analysis

The written argumentation reports were useful tool in analyzing the quality of students' argumentation skills and the progression in argumentation skills with time. The students' written arguments were analyzed using GC-AP with a slight modification keeping in mind the lack of familiarity with discussion and argumentation. The necessary components in a good argument were claim, valid ground and a rebuttal and the grounds were further divided by the researcher into weak grounds and strong grounds. A weak ground included one valid example or elaboration and the strong ground was one with more than one valid example and elaboration.

Each sentence of the argument was analyzed and matched with the GC-AP as was done by Foong and Daniel (2013). The teacher's involvement was minimal during the writing of argumentation report. The aim was to enable students to identify the components of argument and write without any interference.

Table 1
Argumentation Pattern

Component of Argument	Argumentation Pattern
Only Claim	1
Claim with weak ground and no rebuttal	2
Claim with strong grounds and no rebuttal	3
Claim, weak ground and a rebuttal	4
Claim, strong ground and rebuttal	5

Table 1 represent the lowest and 5 represent the highest quality of argumentation. When no claim, ground or rebuttal was made, the argument was coded 0. The students' written argumentation reports were marked on the above criteria and the percentage of students for each argumentation pattern was determined. The performance of the control and experimental group was analyzed using 't' test performed through SPP PASW 18 (reg.).

The questionnaire items were open ended and the student responses were tabulated and converted into percentages. It asked the students to share their experience with argumentation and explain how helpful the method was.

An Example is detailed below to illustrate an argumentation pattern from a topic on terrorism.

Issue: Shall Pakistan withdraw from war against terrorism?

[Gul]: We should pull out of war against terrorism (claim) as it is not our war, it was started by West (ground) → (Pattern 2)

[Ali]: We should not fight war (claim) as these extremists are our own people (ground) and they were just defending themselves (further elaboration) → (Pattern 3)
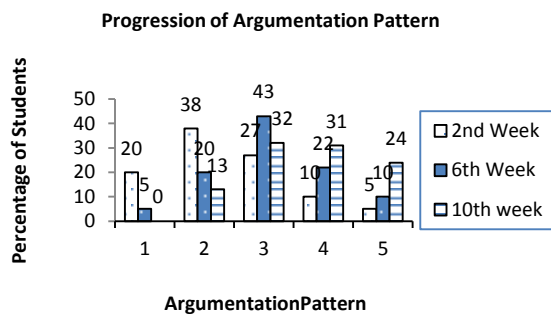
[Farooq]: We should take a strong action against them and crush them (claim). A state can take action against its people if they challenge government writ (ground). Even, they have declared war against our government (elaboration). And the world peace is at stake because of them (further elaboration). They are also involved in kidnapping and suicide bombing as well (elaboration).

We can withdraw if they stop attacking our forces and innocent people and promise to be peaceful (rebuttal) → (Pattern 5).

Results and Discussion

The data obtained from students' written argument is tabulated for 2nd, 6th and 10th week. The purpose was to observe a trend in the progression of argumentation pattern after three weeks duration as differences were more noticeable after this period. Figure 1 shows the progression in the argumentation skills for 2nd, 6th and 10th week.

Figure 1

Progression of Argumentation Pattern

ArgumentationPattern

Majority students acquired low argumentation pattern (20% for pattern 1 and 38% for pattern 2), while very small percentage of students managed to get a high quality argument in 2nd week (10% achieved pattern 4 and 5% acquired pattern 5). Then the progression towards pattern 4 and 5 increased as the students practiced more with argumentation in the 6th and 10 week. The students were more familiar with what was expected and they also learnt from their peers during group presentation of argumentation. In the last week, no student scored pattern 1 representing a claim only. The number of students adding rebuttal to their arguments with valid grounds increased to 55% (pattern 4 and pattern 5 combined). The majority of students progressed to pattern 3, 4, and 5. This data is in conformity with what Venvill and Dawson (2010) identified that argumentation skills can be improved and trained and students can learn to apply their knowledge to justify their decision on controversial issues, a finding outlined by (Foong and Daniel(2013).

However, it was still difficult for students to write rebuttal. Most of the written rebuttals were either weak or could not be identified as a valid rebuttal. The same findings have been reported in many studies, for example Foong and Daniel (2013), Osborne et al. (200) and Topcu, Sadmer and Yilmaz-Tuzun (2010).

In order to evaluate the effectiveness of argumentation method, the performance of students in the experimental group was compared with students' performance in the control group via 't' test using SPSS PASW 18 (reg.). It was found that there existed significant difference in the performance of students in the control and experimental group, t (64) = 5.33, p<.001. This result revealed that argumentation method was effective in improving student's performance and that the students learned better compared to those taught through the traditional method. It is postulated that this may have occurred through enhanced conceptual understanding (Sampson & Clark, 2008) and high quality answers (Nussbaum, 2011). The same finding was also reported by Kaya (2013).

In order to seek students' opinion about their experience with argumentation method, a questionnaire with open-ended items were distributed at the end of term. The questionnaire items were analyzed based on their frequency of occurrence and were then converted into percentages. Table 2 mentioned the views of students about the intervention. The responses securing more than 50% students views were tabulated.

Table 2
Students Response on questionnaire items

Student Response	Percentage
Argumentation helped in understanding concept	72
Argumentation helped in developing critical skills	69
Argumentation helped in making informed decisions	65
Argumentation ensures active involvement during lesson	61
Argumentation skills can be applied in other subjects	58

The students expressed that they learnt more through argumentation and their conceptual understanding improved on the topics being discussed (Kaya, 2013). The experience with argumentation improved their critical skills, which was helpful in making informed decision (Nussbaum, 2011). The students practiced with argumentation skills and they indicated the transfer of the skills to other subject areas as well; an improved conceptual understanding. Similar findings have been reported by Foong and Daniel (2013).

The following students' (pseudonyms) voices clearly indicated their viewpoints:

[Hamza]: The method helped me understand ethical issues and enabled me to make informed choice for the good of people.

[Gula]: I never thought Pakistan Studies can be so interesting. It made me fully involve during the lesson.

[Aba]: I will use this method in understanding other socio-scientific issues.

[Mashaal]: Can we request other teachers to use the same method of teaching? I find it very helpful and we understand each other.

[Sumbal]: We learnt to respect others views and should talk with evidence when making a claim.

Nevertheless, the argumentation method has some limitations. In order to make a decision and then provide justification for the claim with a rebuttal is possible only when the individual has prior knowledge about the topic. As Osborne, Erduran and Simon (2004) suggested, previous knowledge and familiarity with the topic is must for making a rational decision with supporting evidence and construction of interrelationship. Moreover, during argumentation the students make a decision and defend it through evidences to make sense of knowledge and to challenge conflicting ideas. Therefore, there may be instances of confrontational bias (Berland & Lee, 2012; Zeidler, 1997) when students uphold their own ideas and would not accept an opposing viewpoint. However, such situation can be resolved through legitimization of ideas and arriving at a consensus (Berland & Lee, 2012).

Teaching ethics through argumentation is motivating as well as an effective method for fostering conceptual change and affective appreciation. It has the potential and ability to enable our students to study modern ethical issues with a critical mind, to make a decision and to justify their claims using valid grounds. The method is applicable in a range of teaching science subjects, bio-ethics, business ethics and social science subjects that involve diverse opinion and issues. The method also helps in making moral choices and decisions as it involves valid justification and grounds. As Rotblat (2000) expressed, life is the basic value and scientists should ensure that it is not endangered through their work but rather that it is made safe and quality enhanced.

References

Berland, L.K., & Lee, V.R. (2012). In pursuit of consensus: disagreement and legitimization during small-group argumentation. *International Journal of Science Education, 34*(12), 1857-1882.

Bowman, A. (1995). Teaching ethics: telling stories. *Nurse Education Today, 15*, 33-38.

Colliver J.A. (2000). Effectiveness of problem-based learning curricula: research and theory. *Academic Medicine*, *75*(3), 259-266.

Costa, M.L., Rensburg, L.V., & Rushton, N. (2007). Does teaching style matter? A randomized trial of group discussion versus lectures in orthopedic undergraduate teaching. *Medical Education, 41*(2), 214-217.

Dhaliwal U.A. (2007). Prospective study of medical students' perspective of teaching learning media: reiterating the importance of feedback. *Journal of Indian Medical Association, 105*(11), 621-623.

Driver, R., Newton, P., & Osborne, J.F. (2000). Establishing the norms of scientific argumentation in classrooms. *Science Education, 84*(3), 287–312.

Foong, C., & Daniel, E. (2013). students' argumentation skills across two socio-scientific issues in a confucian classroom: Is transfer possible?, *International Journal of Science Education, 35*(14), 2331-2355, DOI: 10.1080/09500693.2012.697209

Iqbal, A. (2004). *Problems and prospects of higher education in Pakistan* (Unpublished doctoral dissertation). University Institute of Education and Research, University of Arid Agriculture Rawalpindi, Pakistan

Johnson D. W. (1984). *Computer ethics: A guide for the new age*. The Brethren Press.

Kaliman E. A., & Grillo J. P. (1993). *Ethical decision making and information technology: An introduction with cases*. New York: Mitchell McGraw-Hill.

Kaya, E. (2013). Argumentation practices in classroom: Pre-service teachers' conceptual understanding of chemical equilibrium. *International Journal of Science Education, 35*(7), 1139-1158.

Lin, S.S., & Mintzes, J.J. (2010). Learning argumentation skills through instruction in socio-scientific issues: The effect of ability level. *International Journal of Science and Mathematics Education*, *8*, 993–1017.

Mahdavikhoua, M., & Khotanloub, M. (2012). New approach to teaching of ethics in accounting: Introducing Islamic ethics into accounting education. *Procedia - Social and Behavioral Sciences 46*, 1318 – 1322.

Martínez, M.M., Bruxarrais, M.R.E., & Esteban, F.B. (2002). La Universidad como espacio de aprendizaje ético. *Revista Ibero-Americana de educación 29*, 17–43.

Noone, P.H., Sharma, S.R., Khan, F., Raviraj, K.G. & Shobhana, S.S. (2013). Use of role play in undergraduate teaching of ethics- An experience. *Journal of Forensic and Legal Medicine 20*, 136-138.

Nussbaum, E. M. (2011). Argumentation, dialogue theory, and probability modeling: Alternative frameworks for argumentation research in education, *Educational Psychologist, 46*(2), 84-106, DOI: 10.1080/00461520.2011.558816

Nussbaum, E. M., & Sinatra, G. M. (2003). Argument and conceptual engagement. *Contemporary Educational Psychology, 28*, 384–395. doi:10.1016/S0361-476X(02)00038-3

Nussbaum, E.M. (2002). Scaffolding argumentation in the social studies classroom, *The Social Studies, 93*(2), 79-83.

Osborne, J. Simon, S., Christodoulou, A., Howell-Richardson, C., & Richardson, K. (2013). Learning to argue: A study of four schools and their attempt to develop the use of argumentation as a common instructional practice and its impact on students. *Journal of Research in Science Teaching, 50*(3), 315–347.

Osborne, J., Erduran, S., & Simon, S. (2004). Enhancing the quality of argumentation in school science. *Journal of Research in Science Teaching, 41*(10), 994–1020.

Osborne, J.F., & Patterson, A. (2011). Scientific argument and explanation: A necessary distinction? *Science Education, 95*(4), 627–638.

Ramos, F.R., de Pires, D.E.P., Brehmer, L.C., Gelbcke, F.L., Schmoeller, S.D., & Lorenzetti, J. (2013). The discourse of ethics in nursing education: Experience and reflections of Brazilian teachers – Case study. *Nurse Education Today, 33*, 1124–1129.

Rathnakar UP, Ullal Sheetal D, Pai PG, Rajeshwari S, Sudhakar P, Shivaprakash G, et al. (2011). Is small group teaching among the under graduate dental students really effective? *Journal of Clinical and Diagnostic Research*, *5*(4), 822-825.

Rotblat, J. (2000). Science and human values. *World conference on science- Science for the twenty first century, A New Commitment* (pp. 45-49). UNESCO.

Samadi, A., & Mahdavikhou, R. (2009). Impact of managerial ethics on organizational commitment: case of employees of Hamedan tax affairs head office. *Tax Journal New Series, 17*(4 (52)), 45-71.

Sampson, V., & Clark, D.B. (2008). Assessment of the ways students generate arguments in science education: Current perspectives and recommendations for future directions. *Science Education, 92*, 447 – 472

ten Have, H. (2006). The activities of UNESCO in the area of ethics. *Kennedy Institute of Ethics Journal, 16*(4), 333–351.

Topcu, M.S., Sadler, T., & Yilmaz-Tuzun, O. (2010). Pre-service science teachers' informal reasoning about socio-scientific issues: The influence of issue context. *International Journal of Science Education, 32*(18), 2475–2495.

Toulmin, S. (1958). *The uses of argument*. Cambridge, England: Cambridge University Press.

UNESCO (2003). Records of the General Conference, 29 September-17 Ocotober. Paris: UNESCO.

van Gelder, T., Bissett, M., & Cumming, G. (2004). Cultivating expertise in informal reasoning. *Canadian Journal of Experimental Psychology, 58*(2), 142–152.

Vanlaere, L., & Gastmans, C. (2007). Ethics in nursing education: Learning to reflect on care practices. *Nursing Ethics, 14*(6), 758–766.

Venvill,G.J., & Dawson, V.M. (2010). The impact of a classroom intervention on grade 10 students' argumentation skills, informal reasoning, and conceptual understanding of science. *Journal of Research in Science Teaching, 47*(8), 952–977.

Wong, E. W. (1995). How should we teach computer ethics? A short study done in Hong Kong. *Computers Education, 25*(4), 179-191.

Zeidler, D. L. (1997). The central role of fallacious thinking in science education. *Science Education, 81*(4), 483–496.

Zohar, A., & Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of Research in Science Teaching, 39*(1), 35–62.