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PEDAGOGICAL STRATEGIES

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Abstract

Edition of articles has been recently proposed as a learning assignment. It ideally suits Computer Science courses, due to the intrinsic mathematical nature of the concepts and structures considered in this field. It also provides benefits in terms of autonomous research and team – working, as well as a valuable legacy for future years' students.

Key words: self study; bibliography; self organized; global information; feedback; student centric; subsidiary

It is out of question that the younger generations of students perceive issues such as socialization, networking and access to information in a fundamentally different way than older generations. They routinely utilize the web not just as an integral tool in their quest for information on any topic, but as a form of self – expression: as points out, digital creation is the standard outlet for their creative urges. They are used to, and lively seek, playing an active role in content management, evolution, or annotation. This means that in addition to creating content from scratch, other forms of interaction such as commenting, tagging are widespread. This behavioral pattern is very well suited to collaborative initiatives such as social news websites, wikis. Regarding the latter, they offer a great opportunity to canalize this content – production pulsion, fostering as well other valuable educational skills, such as team – working among others.

Born in early 2001 as a small collaborative project, Wikipedia has become a huge multilingual, collaborative encyclopedia whose contests are often the prime source when it comes to search for basic information on certain topics. Indeed, several studies have shown that the factual accuracy of Wikipedia article is comparable to reputed commercial encyclopedia.

Quite interestingly, scientific areas in general, and computer science (CS) in particular, are typically very reliable in the Wikipedia (Read, 2006) (such fields usually rest on mathematical foundations, and are less prone to biased editing). This firstly implies that Wikipedia constitutes a valuable resource to CS students looking for complementary information. It can be secondly inferred that a well-informed group of editors and administrators exists for this field. This turns out to be important as a quality filter for a teaching strategy that uses the edition of Wikipedia articles as a student assignment.

As subsidiary benefits of this strategy one can cite autonomous research, team-working, and critical sense (benefits arising from the use of the tool). The primary benefits are the knowledge acquired by students on the topics treated and the valuable legacy for future years' students (benefits arising form the contents developed). Characterization and formal specification of abstract data types. The goal is having the students acquiring an adequate knowledge of the properties and specification of most usual ADTs (stack, queues, trees, etc.) as well as being capable of specifying new ADTs, either de novo or by extending pre-existing ADTs. Formal specification is done using Maude, an interpretable language for algebraic specification based on equational logic.

• ADA focuses on the study of techniques for algorithmic design (e.g., divide and conquer, greedy methods, dynamic programming, etc.), providing the students the means for reasoning about their applicability and suitability for specific problems, as well as for actually applying them. The student should be also capable of analyzing the constructed algorithms in terms of their computational complexity in space and time, as well as as certaining the intrinsic complexity of solving specific problems. As it can be seen, both subjects deal with topics of a strong mathematical foundation, thus naturally adapting to a neutral approach based on mathematical structures and rigorous constructs. It must be also mentioned that Spanish universities and the UMA is no exception– are now involved in the process of adapting to the European Space for Higher Education following the guidelines of the Bologna Declaration. While the new structure of CS degrees has been delineated but not yet applied new teaching methodologies adapted to the philosophy of the European Credit Transfer System (ECTS) –in which the satisfactory completion of a subject amounts to successfully acquiring certain skills and competencies– are already being put in practice (Cotta, 2010). These teaching strategies are student-centric and try to boost autonomous (individual and in group) work by the students. The competence-based structure of subjects lends itself very well to a continuous assessment strategy. Thus, the grade is obtained by the outcome of numerous activities during the semester, including the Wikipedia assignment. The experience has been carried out during academic courses 2007-08 and 2008-09. It has been approached as a team-working activity, and hence students were firstly arranged in groups of two up to four students (the size of the group was later taken into account when assigning topics for edition). The particular composition of groups was a matter of self organization, since the students grouped according to their own personal affinity and interests. After groups were organized, a bidding phase was arranged. I selected a list of topics for which Wikipedia entries in Spanish were non-existent or very incomplete. Having focused on the Spanish Wikipedia is due to practical considerations: in general Spanish sophomore students are not fluent enough in English so as to embark on full-scale editing of the English Wikipedia; forcing them to do so would have place an unnecessary burden on them. Also related to this, the legacy of the experience is going to be much more useful for future students who will find the information in their native tongue. Note also that the topics chosen for edition were intimately related to the contents of the ADT and ADA. The assignment of topics to groups was done on the basis of each group's preferences, prioritizing smaller groups on some topics, and breaking ties using a FIFO policy.

The due date for completing the assignment was the end of the corresponding semester, and students were given some guidelines on how to approach the task:

• A goal was having the Spanish entry of the corresponding article as complete as the English version.

• Bibliographical research on textbooks and Internet was encouraged. A warning was also given with respect to the use of copyrighted material.

• Articles did not need being edited at once, but it was necessary to check carefully (both presentation and correctness) the new material before publishing it.

• Related to the previous issue, spelling, punctuation and writing style had to be carefully revised.

For concluding the stage, Wikipedia is a prime example of a content provider based on crowdsourcing. It is also one of the most popular references from which basic information is sought at an undergraduate level. Actively using this resource not just as an information source but as a vehicle

for canalizing academic content creation is thus a form of positive feedback. It constitutes a way of keeping the ball rolling, contributing to the global information pool. More importantly as to which education concerns, it is an excellent way of promoting self-study of selected topics. The need of communicating academic information in a sensible way (and in an self-organized environment with its own control and self-repairing mechanisms) stimulates the student to comprehend the topic at hand. This is particularly well-suited to subjects in which these topics have a mathematical foundation, or at least rest on rigorous facts and/or procedures, since they rely more on factual accuracy and understanding on the underlying math, than on contextual interpretation or personal bias of the student.

Conclusion

The integration of Wikipedia editing as a pedagogical strategy provides a significant opportunity for students to engage in autonomous research, collaborative work, and critical thinking. By actively participating in content creation, students develop essential academic and professional skills, including bibliographical research, information synthesis, and effective communication. The structured process of contributing to Wikipedia articles reinforces the mathematical and logical foundations of computer science topics, ensuring a rigorous and unbiased approach to knowledge dissemination. Furthermore, this methodology aligns with modern student-centered educational paradigms, fostering self-directed learning and enhancing global information accessibility. Future applications of this strategy may expand beyond computer science, benefiting a wider range of academic disciplines through collaborative knowledge-building.

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