# arXiv.org and Physics Education

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# arXiv.org and Physics Education

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The website arXiv.org (pronounced *archive*) is a free online resource for full-text articles in the fields of physics, mathematics, computer science, nonlinear science, and quantitative biology that has existed for about 15 years. Available directly at http://www.arXiv.org, this e-print archive is searchable. As of Jan. 3, 2007, arXiv had open access to 401,226 e-prints in the topic areas.[1] Those who sign up for an ID and password can also sign up for daily submission abstract emails for specific subject classes of arXiv, including physics education, physics and society, and history of physics. Founded and developed by Paul Ginsparg when he was at Los Alamos National Laboratory, arXiv's original name was the LANL preprint archive or xxx.lanl.gov. The location and name changed after Ginsparg moved to the physics department at Cornell University. Today, arXiv is hosted and operated by Cornell University library. Mirror sites for arXiv exist worldwide.[2]

## Retrieving Articles

By design, arXiv is a highly automated electronic archive and distribution server that is openly accessible. Like many archival sites, full-text articles are viewable on arXiv; however, these articles are available for free, without any fees or subscriptions. Although the website or one of the mirror sites can be searched via engines such as Google Scholar, arXiv can also be searched directly.

In addition, the site lists articles by their various subject classes. One can select viewing recent articles in general or within a particular subject class. Individual subject classes of particular interest to *TPT* readers include physics education (physics.ED), history and philosophy of physics (physics.HI), and popular physics and society (physics.PS). The subject class names in parentheses are used in the identifier, which reflects the subject class as well as the year and month of submission.[3] Although articles are not "peer reviewed," moderators for the various categories strive to approve only those submissions that are expected to be of interest, relevance, and value to the readers of that particular discipline.

Like peer reviewers, moderators are highly qualified individuals with considerable knowledge in the subject area who perform their duties because of their interest in helping arXiv. Moderators follow guidelines for accepting submissions. Advisory committees oversee subject class archives and select moderators for subject classes. Advisory committees are overseen loosely by an arXiv advisory board. The advisory board serves as consultants to the Cornell University library staff, who make all policy decisions including requirements for moderation and submissions.

## Submissions

It is important to note again that arXiv submissions are not *peer reviewed.* Instead, submissions are moderated and several steps have been taken to ensure quality submissions. On Jan. 17, 2004, arXiv began requiring new authors to be endorsed by another user before submitting their first paper to a category or subject class. This new endorsement system was developed to verify that arXiv contributors belong to the scientific

community. Moderation and the specific submission requirements were developed to maintain low cost.

Previously, submissions required the use of TeX or LaTex because both produce high-quality PDF format output while maintaining contextual information including highly complex formulae. LaTex is not a word processor; instead it is a document preparation system for high-quality typesetting typically used for scientific and technical documents.[4] However, arXiv recently started accepting PDF format files generated from word processors such as Microsoft Word. These new requirements maintain a standard for submissions yet allow greater flexibility for submitting authors.

Authors must submit a full paper for consideration, not simply an abstract. Authors also select the subject class for the paper, which then will be evaluated by a moderator from that subject class. In cases where an author feels the paper is of direct interest to readers of another subject class, the paper can be crosslisted to that other subject class. Authors should consider no more than one or two crosslists for a submission. Again, as part of the guidelines for arXiv moderation, a moderator will judge the appropriateness of the paper for each crosslist subject class. If accepted by moderators from the crosslist subject classes, the paper will appear in those regular listings as well.

Submissions are not copyrighted by arXiv. Some journals, such as the *American Journal of Physics*, encourage those submitting to their journal to also submit their article to arXiv. However, some journals require that once they have published an article, it be removed from arXiv. Similarly, some journals ask that the final typeset version of the journal article be submitted as the final version available on arXiv, while others allow for published articles to appear on arXiv but not in the final typeset version. Those submitting prepared journal articles to arXiv should check the journal's copyright and web posting guide, such as that available for *TPT* online. Journal articles are not the only types of submissions arXiv seeks. arXiv also seeks other appropriate papers such as those presented at professional conferences and meetings.

## Types of Articles and Authors

Submissions to arXiv are international in scope, with many authors from outside the United States. Certainly, *TPT* readers would recognize many author names submitting to the physics subject classes of arXiv while other author names would be unfamiliar. The physics archive consists of 21 subject classes, each with a particular focus. Those thinking about making a submission should become familiar with the types of articles already posted within the subject class of interest.

For instance, a paper submitted to the physics education subject class should specifically pertain to the teaching and learning of physics education. A review of current papers within the physics education class range from textbook evaluations to evaluations of student understanding. Typically, derivations and intensely mathematical calculations are not found within the physics education subject class.

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### References

1. http://www.arxiv.org/help.
2. See the arXiv entry at http://www.wikipedia.com.
3. http://arxiv.org/help/arxiv_identifier.
4. http://www.latex-project.org/intro.html.

PACS codes: 01.30.-y, 01.40.Fk, 01.75.+m

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