

What is Undergraduate Education?

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Education as Degrees and Certificates

For many people, being educated means attending educational institutions and receiving certificates or degrees. This popular view is perhaps fostered by the approach to education as an economic investment for the future. Those who have higher degrees have a greater chance of getting better paid jobs, and therefore it is prudent to invest time and money in higher degrees. Now, no one can afford to ignore the fact that higher degrees increase the probability of higher income in the modern world. Having acknowledged this, however, one must also recognize that higher income cannot be the sole purpose of education.

In order to separate the substance of education from the external trappings of educational institutions and degrees, some educationists distinguish between *schooling* and *education*. Schooling is associated with educational institutions and degrees; education is associated with learning in a broader sense. Once we make this distinction, it becomes clear that one who does not have even a high school certificate may be highly educated, and that having a Ph.D. degree is no guarantee that one is educated. To think of education in terms of degrees and certificates alone is to confuse education with schooling.

Education as Preparation for a Career

Education has also been seen popularly as a preparation for specific careers, that is, as *professional training*. A university programme in law, for example, prepares one to function efficiently as a lawyer, and a programme in engineering prepares one to function efficiently as an engineer. Preparing an individual for a specific career involves providing the basic knowledge required in the profession, as well as the skills needed for its practice. Other tertiary career-oriented programmes include business administration, social work, and medicine.

Many educational programmes in a university, however, cannot be designed to prepare students for specific professions. It is true that a Ph.D. student in physics expects a career in physics, but this is hardly true of an undergraduate student in physics. A small number of students who receive an undergraduate degree in physics go on to graduate work, hoping to become professional physicists, but the majority of students take up a variety of career paths which do not require any specialized knowledge of physics. This is equally true of other undergraduate subjects like mathematics, chemistry, biology, economics, history, philosophy, linguistics, literature, and so on.

If a non-career oriented undergraduate programme is to be valuable to students, it should be based on this dual function. On the one hand, it should prepare a small number of students to pursue graduate studies for a career that requires specialized knowledge of the discipline. This is the *professional goal* of the programme. On the other hand, it should also benefit those who are not going on to careers related to the discipline. Specialized knowledge of biology or English literature may not be directly relevant to one who becomes a business executive or an MP. For the programme to be meaningful for this category of students, it should aim at a body of skills and knowledge relevant for any career path. This is the *educational goal* of a programme. If we accept this view, the

immediate question that we must raise is: what is the educational value of a non-career oriented undergraduate programme?

Education as Individual Development

Suppose we begin with the idea that education is *the process of the development of an individual's mind, fulfilling his/her inner potential*. If we equate education with degrees and diplomas, we will have to conclude that the process of education ends with the last diploma or degree one receives. On the other hand, if we accept the view that education is mental development, it follows that education does not terminate with a high school certificate or university degree. The function of an educational programme is to trigger and facilitate this mental transformation, instill the desire for mental growth, and equip the individual with the tools of continued self education, so that education in this sense becomes a lifelong quest.

If we accept this philosophy of education, we have to ask ourselves what kinds of goals an educational programme should be aiming at. What are the qualities of mind that it should aim to develop and strengthen? How can these aims be achieved? Answers to these questions must explore the intellectual, aesthetic, emotional, ethical, moral, cultural, and spiritual content of education. For the sake of practical convenience, however, I will explore in what follows just one of these threads, namely, intellectual development. This is not to imply that the intellectual content of education can be divorced from the rest in any meaningful fashion.

Education as Cultural Induction

An important factor that contributes to education is what has been called *cultural literacy*, or the information that an individual needs in order to thrive in the modern world, in domains ranging from sports to science. There is a minimum amount of information that society expects of a high school or university graduate. For example, we do not expect a high school graduate of the 1990s to entertain the belief that the sun goes round the earth, or to not have heard about William Shakespeare or Albert Einstein. An adult who doesn't know what "genes" are, and where the Himalayas are, is unlikely to be a high school graduate. One may expect a university graduate to have heard of the big bang theory of the evolution of cosmos, and why matter expands when heated.

Now, the quantity and kind of knowledge that an "educated" individual ought to have is determined by the time-bound socio-cultural setting. Expecting all educated individuals to share a body of knowledge approved by a society is a way of making individuals conform to certain social standards.

While this cultural induction may be important, we must ask whether it is sufficient for a university to disseminate existing knowledge. The answer is no. Knowledge is never static. The last few decades have seen such rapid advancement in most domains of human knowledge that a great deal of what we know now (and hence what is taught in centres of learning) will turn out to be false or out of date in ten or twenty years. If educational institutions focus solely on handing down ready-made knowledge, their graduates will be out of date soon after their graduation. What, then, should we aim at?

Education as Training in Creative and Critical Thinking

If we agree that education is a lifelong process of mental development, and that it must continue to take place in an individual beyond the institutionalised programmes of schools and universities, the programmes must also seek to develop in students *the ability to acquire more knowledge and to modify previous knowledge*. This goal is obviously

more fundamental in an educational programme than the goal of handing down existing knowledge.

What does the ability to acquire knowledge and to update knowledge consist of? The stereotypical answer is that it involves the search for knowledge in books (or other repositories of knowledge, such as videos, computer programmes, or people) and the ability to understand what they provide. If one wants to find out precisely how an embryo grows into an adult organism, one should be able to go to a library or bookstore, find out how much knowledge has been accumulated on the topic, and understand the processes that biologists have already shed light on.

A moment's reflection will reveal that this view of the acquisition of knowledge is inadequate. Human knowledge is necessarily tentative, every stage of our understanding ready to be replaced by a better form of knowledge at the next stage. If there is one fundamental lesson that the history of science has taught us, it is that science (or any other mode of inquiry) is not infallible.

Given tentativeness and lack of certainty of human knowledge in almost all aspects of life, it is crucial what we need is *the ability to critically evaluate what is presented as knowledge, and accept or reject it on the basis of evaluation*. This involves distinguishing facts from assumptions and both from opinions, scrutinising the evidence for conclusions, distinguishing well substantiated conclusions from baseless assertions or falsehoods, and checking the internal logic of a body of knowledge. This ability for critical evaluation, including the evaluation of one's own ideas, is an important skill that should be inculcated and strengthened through educational programmes. An intellectually healthy mind is never closed or stagnant: it is open to new knowledge, and constantly ready to expand and modify itself on the basis of new experience.

There is yet another reason why reading and understanding articles and books is not enough. There are many questions to which answers cannot be found by going to the library or consulting learned people, since no one has discovered answers to these questions. In such cases, we ourselves have to build the knowledge we seek, instead of relying on ready-made knowledge. If educational programmes are to develop in students the ability to acquire more knowledge, they must develop *the ability to build new knowledge, and modify existing knowledge if necessary*.

In sum, we want educational programmes not only to hand down ready-made knowledge, but also to teach students how to acquire and test further knowledge. This involves searching for existing knowledge and critically evaluating it, as well as modifying existing knowledge and building new knowledge. In other words, what is important is the *process* of acquisition of knowledge, not the *product* itself. An educated individual is not a passive consumer, but an intelligent critic and active creator of knowledge.

If we accept this, a surprising conclusion emerges. The skills that we expect an educational programme to inculcate are precisely the skills that a researcher in any domain needs in order to conduct original research. By "research", I do not mean writing papers for publication or theses for a degree, but the investigation of phenomena to advance one's knowledge. The skills of doing research include the ability to observe carefully, arrive at conclusions, check the logic of conclusions, make hidden connections, see patterns, and so on, which constitute the core of what we identified as education. In effect, therefore, we are saying that educational programmes, even at the undergraduate or high school level, should teach students *how to do research* at an appropriate level.

I should hasten to add that when we teach an undergraduate student the skills of advancing knowledge, we do not demand that the student make original contributions to the existing body of knowledge. What we do in the classroom is simulate the conditions of research in order to teach research skills. How this is done would vary from subject to subject, and from teacher to teacher.

Tranferrable Thinking Skills

Why should one go through an undergraduate programme in a subject like physics, biology, mathematics, economics, linguistics, literature, history, or philosophy? Having acknowledged the legitimacy of better jobs and the value of the information content associated with the discipline, the answer is that the primary value of such a programme lies in the modes of thinking associated with the discipline. Most students tend to forget the details of a high school or university subject a few years after graduation. In contrast, the *modes of thinking* required in the pursuit of the discipline are more long lasting, and are transferred to other domains, wherever needed. These thinking skills, which constitute the true value of education, are what a non-career oriented undergraduate programme should focus on.

For several years, I have consistently adopted this perspective of teaching in my field, namely, linguistics. Linguistics is not a subject that is taught in schools or junior colleges, and therefore undergraduate students who enroll themselves in a linguistics programme have to start with the very basics of the discipline. When I teach an introductory course in linguistics, I start with *simulated research* from the very beginning. Students learn linguistics by discovering patterns in the data, constructing theories that account for the data, checking their analyses on the basis of further data, exploring alternative solutions, checking sets of statements for logical consistency, and so on. These are precisely some of the activities that go into professional research in linguistics as well. More important, these are thinking skills that can be applied to any academic activity. Within this mode of education, students enjoy what they learn, and the learning is more efficient, productive and long lasting than what happens in the traditional classroom.

The idea of teaching beginners how to do research can be implemented in any classroom, with some imagination and effort. Research is not something that is restricted to professional researchers or Ph.D. candidates. It should be part of any educational programme that aims to develop the mental faculties of individuals. The difference between a young student and a professional researcher is only that the former is a beginner, while the latter has had a great deal more experience. Viewed in this light, education becomes an exciting path of discovery and self transformation, and it is hard to see how young minds can resist its powerful attraction.