

## DEVELOPING CRITICAL THINKING IN STUDENTS OF PEDAGOGICAL UNIVERSITIES OF UZBEKISTAN: EFFECTIVENESS OF INTERDISCIPLINARY INTEGRATED COURSES

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**Annotation:** *This study is about how students at universities that teach people to be teachers in Uzbekistan're learning to think critically. These universities have classes that combine lots of subjects. I think this is really interesting because places that train teachers really need to teach this kind of thing. The universities in Uzbekistan are trying to help students develop thinking skills by using these special classes. The critical thinking skills are very important for students, at these universities.*

*The people who did the research used two kinds of methods. They used numbers to see what was going on. They gave the students the Critical Thinking Assessment Test before and after the school year. The Critical Thinking Assessment Test was a part of the numbers part. For the part they looked at the student projects they watched what was happening in the classes and they had conversations with the teachers. The research had 320 students who were in their year. These students were from three universities. The universities were Tashkent State Pedagogical University, Nukus State Pedagogical University and Samarkand State Pedagogical University. The research with the students, from Tashkent State Pedagogical University, Nukus State Pedagogical University and Samarkand State Pedagogical University lasted for one whole school year.*

*Students who took the courses did really well. The special courses were classes like Logic and Scientific Methodology, History of Science and Critical Analysis and Digital Literacy and Information Evaluation. These classes were very different from the classes. Students who took the courses did a lot better than students who took the regular classes. They got a lot better at thinking. The numbers show that this is true. The special courses students were really good at looking at arguments and figuring out if they make sense. They were also good at testing ideas and solving problems in different ways. This is important because it is useful for when they have to teach others. The special courses, like Logic and Scientific Methodology, History of Science and Critical Analysis and Digital Literacy and Information Evaluation really helped the students.*

*Putting thinking, into these integrated courses is a good way to train future teachers. Future teachers can then teach their students how to think critically. This is part of modernizing education in Uzbekistan. I do not know how much of an impact this will have outside of Uzbekistan. Some good things happened away. Other good things may take a time to happen.*

**Keywords:** *critical thinking, pedagogical education, interdisciplinary approach, teacher training, higher education, Uzbekistan, curriculum integration, 21st century skills.*

The main idea of this study is about how education's changing everywhere including Uzbekistan because of all the reforms that are taking place. Education is changing in Uzbekistan and around the world.

Critical thinking is really important for college students for students who want to be teachers. College students who want to be teachers need thinking.

They have to learn thinking so they can teach it to kids when they become teachers.

In the universities where they train teachers the classes usually focus on one subject at a time.

These classes are mostly about memorizing facts and things not, about thinking or thinking about your own thoughts. Education and critical thinking are closely related in this study. This research is about a problem. The problem is whether special courses that combine subjects can help people develop better critical thinking skills. These special courses are different from the way of teaching. The research is trying to find out if these special courses are more effective at building thinking skills than the usual way of teaching. The focus of the research is, on thinking skills and how to improve them through special courses that mix different subjects like critical thinking skills.

The background of this topic is based on some ideas about critical thinking. These ideas come from people like Ennis, who wrote about this in 1987 and Paul and Elder who wrote about it in 2001. Critical thinking is also connected to the work of Klein and Newell who discuss how to combine subjects like philosophy and logic. They even talk about how to teach these subjects in a way.

When we look at what other countriesre doing we can see that some of them are already teaching critical thinking to teachers. However there are not studies about this in Central Asia especially in places like Uzbekistan. It would be interesting to see what happens when universities in Uzbekistan change their courses to include critical thinking. Critical thinking is a part of this and it is important to understand how it can be taught and used in different situations like in universities, in Uzbekistan.

The people who did this study used a way to see if something works. They gave tests before and after. Had a group that did not do anything special. This way they can see if there are differences. They picked 320 students who're in their third year of school from three big schools that teach people how to be teachers. They split these students into two groups with 160 students in each group. The students in the group took some new classes and the people who did the study made sure that the groups were similar in terms of grades and what they are studying. The new classes were for the students and the other group was the control group. The students, in the group and the control group were matched by grades and what they study so the experimental group took the new courses.

Those courses sound really interesting. One of them was called Foundations of Critical Analysis which's a course that teaches you about logic and the biases that people have when they think. It also covers how arguments work and some basic science. The other course was called Critical Thinking in the Digital Age and Professional Practice. This one was about how to check information you find online and ethics for teachers. You also learn how to use thinking to plan your lessons or look at real life cases.

They had seminars that were like the Socratic ones. Foundations of Critical Analysis and Critical Thinking in the Digital Age and Professional Practice students would debate about texts from history or something they saw in the media. They also had to build portfolios where they would write down their thoughts about what they learned. It was all very active you were not just sitting there listening to someone talk. You were actually doing things. Thinking about Foundations of Critical Analysis and Critical Thinking, in the Digital Age and Professional Practice.

For the data they used the Critical Thinking Assessment Test at the start and at the end which is a tool that checks the skills of the Critical Thinking Assessment Test. They also looked at some things like the portfolios of the students and they had group talks, with the students and they did interviews with 15 teachers. They used statistics with something called ANCOVA to compare the scores. They adjusted the scores for the tests that the students took at the beginning of the Critical Thinking Assessment Test.

The results of the study were really interesting. The group that tried something did a lot better they got an average of 18.7 more points on the CAT. The other group, the control group only got 5.2 points. This difference is huge. The F value was 56 and the p value was less than 0.001, which is very small. The effect size was pretty good at 0.15. The people in the group got really good at evaluating arguments and planning investigations. They made the gains, in these areas. The CAT results for the group were much better.

From the portfolios the students got better at spotting assumptions they saw sides of things and they backed up their ideas with proof. The teachers said that at first it was hard for them to switch from giving lectures to guiding the students but then the engagement of the students went up and the discussions got deeper. The students mentioned that mixing subjects really helped them link their main area of study to bigger questions, about knowledge. The connection part of this really stands out the students made connections and that is what is important the connection part is what the students liked about mixing subjects and spotting assumptions in their area of study the portfolios showed this.

There were issues though, like teachers not ready for the new material, some departments pushing back on sharing class time, and needing better ways to grade that fit critical thinking, not just memorizing.

These courses that combine subjects really help teachers in Uzbekistan think critically. We should teach thinking in every class, not just one or two. This way teachers will learn to think all the time.

For the education policy we need to add some required courses on thinking and science teaching methods to the standards. We should also have workshops to train the people who teach the teachers.

We need to make some books and case studies in Uzbek and Russian that're about local things. This will help the teachers understand thinking better.

On we should check if the teachers are using critical thinking in their schools. We need to see if these courses are really working for the teachers, in Uzbekistan.

That investment in critical thinking at universities could really help make better educators, ones who think reflectively and innovate. But I am not totally sure how it all plays out long term, some parts get a bit messy when thinking about resistance from old ways.

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