Investigation on learning behavior of undergraduates in application-oriented universities

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Abstract. Based on the NSSE-China measurement tool, combined with the actual situation, as well as the need for research, selected some indicators, and finally compiled the undergraduate learning input research questionnaire, online questionnaire research for all undergraduates, and at the same time, through the student symposium, field visits, and other forms of offline research. By analyzing the results of the empirical research on undergraduate learning investment in the School of Information Technology of NingboTech University, the problems existing in undergraduate learning investment in applied colleges and universities were found, and targeted suggestions and improvement initiatives were finally put forward to address the existing problems.

Keywords: undergraduate students; learning engagement; learning styles; teaching assessment.

This study used an online questionnaire to collect data. The survey was conducted using whole group stratified sampling method, and the questionnaire was distributed online through Questionstar survey platform from January 15, 2023 to April 15, 2023, and undergraduate students of the School of Information were invited to fill out the online questionnaire, and a total of 661 students participated in the survey, and all the questionnaires returned were valid.

1. Learning engagement state analysis

The Undergraduate Learning Engagement Scale was measured on a 4-point percentage scale, i.e., by choosing different options the score decreases in the procedure described by options 1-4. For example, choosing different options among the four items of "very often, often, sometimes, never" and assigning points to each of them, the scores were calculated sequentially, and 50% was taken as the theoretical median of observation. This study analyzes the dimensions of undergraduates' commitment to learning in terms of the five major indicators, motivation, deep learning, and learning gains.

The Undergraduate Learning Engagement Survey consists of five major indicators, each of which contains a varying number of questions, with the five indicators containing a total of 32 questions. The chart below shows the five indicators:

Table 1. Five major indicators

Indicator name	Number of questions
Level of academic challenge	2
Level of active and cooperative learning	6
Frequency of student-teacher interaction	9
Richness of educational experience	12
Supportiveness of the campus environment	3
add up the total	32

2. Conclusions and recommendations for response

2.1 Conclusions of the study

2.1.1 Low frequency of student-teacher interaction

The statistical results show that the mean values of student-teacher interaction levels are generally lower than the theoretical median of 50%, reflecting the low frequency of student-teacher

interaction in the College of Information. The mean values of question items 5c, 5e, and 5f are 41.3%, 36.61%, and 40.7% respectively are lower than the theoretical median, and the mean values of question items 6a, 6b, 6c, 6d, and 6e are 40.24%, 37.37%, 37.52%, 37.07%, and 37.82% respectively are lower than the theoretical median. The low frequency of student-teacher interaction indicates that the relationship between students and teachers is relatively detached, which is mainly manifested in the fact that students' learning performance in the classroom does not receive timely feedback from the instructors, students and instructors discuss their assignments and exchange classroom problems to a lesser extent, and students seldom discuss their professional learning plans with their instructors or undergraduate advisors. Meanwhile, outside the classroom, students and teachers (counselors/class advisors) have infrequent exchanges on career planning and job placement. All these indicate that the level of student-teacher interaction is low, which is very unfavorable to students' learning and development. The reasons for this can be attributed to the following two aspects: from the teacher level, the baton of evaluation and assessment in colleges and universities determines the allocation of teachers' time and energy, teachers generally emphasize scientific research and emphasize teaching, and the evaluation of teachers' titles relies on the output of scientific research results, and only a small portion of their energy is focused on classroom teaching, which results in the fact that exchanges between teachers and most of the students are limited to the classroom, and the exchanges are infrequent. From the student level, a part of the students after the college entrance examination, into the university lost their way, can not find the goal of learning, and then began to get by, relaxing on the requirements of self, before the class pre-study is not sufficient, after the class did not follow up in time to consolidate the learning motivation is weakened. Students do not dare to take the initiative to communicate with teachers, and their ability to actively acquire knowledge is low.

2.1.2 Some learning behaviors of undergraduate students need to be improved

Undergraduate learning behaviors are divided into two parts: course learning behaviors and extended learning behaviors outside the course. The survey data showed that the rigor of the course requirements in the College of Information Technology was high, with 11.5% of the students strongly agreeing and 36.01% agreeing that they had to study very hard to meet the course requirements. The mean value of 47.51% for question item 5d is close to but below the theoretical median, indicating that the course is on the difficult side of the learning difficulty scale.

The degree of difficulty of course learning affects students' classroom learning behavior to a certain extent. Under the premise that the difficulty of course learning is moderately difficult, it is found that, in terms of classroom learning behavior, students are less likely to participate in classroom discussions, rarely take the initiative to make prepared speeches, students' ability to take the initiative to ask questions is weak, it is difficult to question the teacher's teaching content in the classroom, students seldom discuss problems in the classroom or in the readings with the teacher of the course, and they seldom discuss the ideas and problems of their studies with their classmates and friends who are not members of their own class. In the specific case of each question item, the mean values of question items 4a, 4c and 4g are 37.52%, 42.06% and 23.75% respectively are lower than the theoretical median, and the mean values of question items 5f, 5g and 5h are 40.7%, 48.87% and 48.41% respectively are lower than the theoretical median.

It was found that in terms of undergraduate students' extended learning behavior outside the classroom, students have low willingness to go abroad for short-term and long-term exchange and study, seldom go to listen to lectures or reports of interest, seldom visit exhibitions, watch cultural and artistic performances inside and outside the university, and go to libraries or study rooms with low frequency of study. In the specific case of each item, the mean values of items 5a, 5b, 7a, 10f, 10i and 10j are 48.11%, 38.88%, 41.15%, 36.91%, 44.33% and 47.5% respectively are lower than the theoretical median.

The synthesis of the above undergraduate students of the College of Information Technology's curriculum learning behavior, extended learning behavior outside the curriculum and other two aspects of the performance of the lack of ability, indicating that the students' initiative in learning is

not strong, the ability of independent learning is weak, and the willingness to study overseas for further education is low. The reasons for this are, firstly, that students invest less time and energy in their studies. In terms of academics (in addition to attending classes) investing time of 15 hours and above per week (7 days a week), only 58.55% of the students in the College of Information Technology at least average more than 2 hours of study time per day. University study is relatively open, providing students with a lot of free space, students in the self-management of time is a trend of polarization, a small number of self-motivated students can better distribution of time for study, work and life, learning self-motivated students are weak, in addition to passive completion of the mandatory tasks set by the teacher, seldom take the initiative to plan and manage their own study time. Secondly, the low level of foreign language of the students in the College of Information Technology directly leads to the students' weak willingness to go abroad for further study. Language learning, especially English learning, is common in universities where students can take exams but cannot express their thoughts coherently in English, even if they have their own views and ideas on the issues discussed. At the same time, students are generally fearful of full English lectures, not confident enough in their English proficiency, and lack exercise and practice.

2.2 Recommendations

Based on this research on undergraduate learning input, the following points are proposed for better promotion and improvement of undergraduate education quality:

2.2.1 Promoting a full mentorship system to enhance the frequency of student-teacher interaction inside and outside the classroom

Establishing a good teacher-student relationship is the foundation of college education and a necessary condition for improving teaching effectiveness and students' learning interest. By equipping each undergraduate student with a mentor, we will promote in-depth teacher-student exchanges with point-to-point guidance, further improve teacher-student relationships, strengthen the relevance and effectiveness of student-teacher interaction in five aspects: academic guidance, disciplinary competitions, innovation and entrepreneurship, scientific research and practice, graduation design, etc., and open up the traditional teaching and ideological work to form a synergy of nurturing, so as to strengthen the frequency of student-teacher interactions both inside and outside of the classroom. All in-service teachers are required to serve as mentors of the mentorship system. Sophomore students in the School of Information Technology identify their mentors through a two-way selection mechanism based on their relevant professional backgrounds, mentors, and personal strengths and hobbies. Undergraduate students make course study plans and practical training plans under the guidance of their mentors, participate in various projects such as scientific research projects, disciplinary competitions, and innovative practices of their mentors, and report the progress of their projects to their mentors on a regular basis. By actively creating an interactive and communicative educational environment, the School of Information Technology enhances the participation and interest of undergraduates and promotes their independent learning and growth.

2.2.2 Building a three-integration system to enhance student learning initiative inside and outside the classroom

Efforts are being made to further build a practical education system that integrates production, science education and competition education, and to open up a practical education channel that integrates classroom teaching, discipline competition and production application. Our understanding of traditional education is limited to teachers imparting knowledge and students learning knowledge. In the new era, future-oriented education needs to cultivate students' creativity. This requires university education to fully combine theory and practice, innovate classroom teaching methods and means, encourage everyone to participate in disciplinary competitions, advocate in-depth access to enterprise internships and graduation design problems, student-centered, professional knowledge transfer, training in innovative thinking, comprehensive quality training,

engineering ability enhancement as the output orientation, reform the classroom teaching content, methods and approaches, and promote student learning inside and outside the classroom. Initiative.

Establish a system of undergraduate learning goals. Schools can establish a rigorous system of undergraduate learning goals so that students enter school with a clear idea of what they are working toward. The school provides academic counseling and personal growth guidance to help students better achieve their goals. Inside the classroom, teachers should clarify the course objectives and assessment criteria before offering the course, so that students know the learning requirements and evaluation criteria, and so that they can better assess and adjust their learning behaviors. Outside the classroom, cultivate undergraduates' independent learning ability. The extracurricular study of undergraduates relies more on their own autonomy. The university has set up study rooms, examination areas, open libraries and laboratories, etc., providing rich online and offline learning resources and encouraging students to explore their own learning styles. The curriculum can appropriately add some modules chosen by students independently so that students can better utilize their learning interests.

2.2.3 Improving the teaching evaluation system to stimulate internal motivation of teachers to teach and students to learn

Teaching evaluation is one of the important means to improve the quality of teaching, which can help teachers to improve their teaching behavior and help students to improve their learning behavior, but there may be some drawbacks in the conventional way of teaching evaluation. First, it is suggested to use a variety of evaluation methods. For example, classroom observation, group discussion, student self-assessment, teacher supervision, etc., to evaluate teaching quality from multiple perspectives and obtain comprehensive feedback information. Second, it is suggested to introduce student participatory evaluation. Student participatory evaluation can better reflect the teaching effect and help improve students' active participation and quality control ability. Teachers can guide students to carry out self-assessment or group evaluation during the teaching process, thus promoting students' thinking and communication and enhancing their self-awareness and initiative in learning. Thirdly, the feedback and application of evaluation results should be highly emphasized at both school and college levels. Teaching evaluation results should be fed back to teachers and students in time and applied. Teachers should analyze and reflect on the evaluation results to find out where the problems lie and improve their teaching methods and approaches in time. Students can also adjust their learning styles and methods according to the evaluation results to improve their learning effects. Fourthly, the content and methods of evaluation should be adjusted and optimized regularly. Teaching evaluation is not static and should be adjusted and optimized according to the characteristics of teaching and students. For specific courses or groups of students, different evaluation methods and contents can be used to better reflect the effectiveness of teaching.

Funding project

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