Integration Strategy and Quantitative Analysis in Improving Blended Learning Effect for Higher Vocational Students

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Abstract. With the vigorous push of information technology, various industries have produced different "Internet plus" mode. In higher vocational colleges, the teaching mode of "blended learning", which can make full use of teachers' and students' fragmented time and realize customized learning, arises at this historic moment. The survey results have shown that the learning platform, resource allocation and instructional design are the main factors that affect the effectiveness of blended learning. In order to improve the effect of blended learning, it is necessary to integrate learning platform functions and learning resources to match students' needs. On the basis of this, supplement of scientific instructional design would make the blended learning interesting, useful and effective.

Introduction

In May 2020, the Government’s Work Report of China clearly pointed out that "promote the fair development and quality improvement of education" and "let educational resources benefit all families and children so that they can have a brighter future" in the "focus on ensuring and improving people's livelihood and promoting the reform and development of social undertakings".

The Ministry of Education in China has put forward some suggestions on deepening the reform of occupation education and teaching in an all-round way to improve the quality of personnel training ([2015]6). It is proposed that we should make the modern information technology play full role, explore and build a new teaching and learning mode under the information environment actively. Traditional education and teaching methods are blocked by geographical location, and learners in different regions cannot enjoy the same educational resources. However, with the development of modern information technology, such as mobile Internet, cloud computing, big data, virtual reality (VR), augmented reality (AR) and mixed reality (MR), educational resources online are gradually becoming more and more fair; with the construction of a networked, digital, personalized and lifelong education system, the idea like "everyone can learn everywhere at any time" is deeply rooted in people's minds\textsuperscript{[1]}.

The combination of online learning and offline learning makes it easy for learners to acquire abundant and instant learning resources, which aims at improving the effectiveness for a given period of time when learning. In the higher vocational colleges, if the "user centered" smart learning platform is equipped with "quantity and quality" learning resources, supplemented by "Three Characteristic" instructional design, the effect of blended learning can be enhanced.
The Characteristic of "User Centered" Smart Platform

The users of the blended learning platform include all kinds of people who use the platform, such as teachers and students, educational administration personnel, backstage maintenance staffs… But the most important ones are teachers and students. Among them, teachers use the platform to publish learning resources, conduct online teaching, view learning effects, feedback learning problems, etc. Students use it to view learning resources, online learning and so on.

Assistant Teachers Intelligently

After interviewing with teachers, it is found that the functional modules which teachers expect to solve mainly focuses on uploading resources, building up courses, interacting and communicating, correcting homework, scoring statistics... When using, the teachers focus on friendly interface, simple operation, fast speed, stable results and data sharing.

If the concept of "smart" can be added to the platform, such as notifying the results of students' learning progress, assignments and other data and giving relevant adjustment suggestions in time, teachers can adjust offline course content according to students' online learning status, so that online and offline can complement each other.

Enough Needed Functions

In addition to the regular functions required by online teaching, the learning platform also needs some auxiliary functions. As there are a large number of resources in the platform, when uploading and using learning resources, functions such as "duplicate check", "preview", "replace", "sort", "search by category", "batch processing" are particularly important. When teachers develop learning resources, if the platform can provide the corresponding "template style", the teachers’ work would become easy. After teachers assess the assignments, if the platform can report the relevant data of the assignments actively, the teachers’ work would become timely. If the platform can generate "questions set" and exercises automatically according to the problems in the homework, the teachers’ work would be time-saving. If it can combine the learning process, form relevant guidance for the next stage, the teachers’ work would be more effective. The realization of these smart functions is very helpful for teachers to improve their work efficiency.

The figure 1 shows the proportion of expected functions as following.

![Figure 1. The proportion of expected functions.](image-url)
Better User Experience

In the process of using learning platform, teachers’ experience is also the main factor affecting the teaching effect. In addition to the beauty of the interface, the user experience also means in terms of clear navigation, simple steps, unified operation, consistent results, quick response, accurate feedback.

Clear navigation refers to that the teachers should be informed of their current position clearly to ensure that they will not get lost when using the platform, so that they can use it more comfortably and happily.

Simple steps are mainly reflected in the reduction of operating costs as much as possible. At the operational level, efforts should be made to "be able to choose not to input, have a history to track" and so on.

Unified operation means that no matter when and where the teacher uses the platform, as long as the problems are the same, the operations will not change due to time, space and operator.

Consistent results mean that the same operation should get the same results, and there is no uncertainty in the results.

Quick response means that teachers can get feedback about their current state at any time, which can reduce their anxiety of waiting in the process of using. In the survey, it was found that about 50% of users would give up the idea of using the platform due to their untimely response.

Accurate feedback means that the feedback to the teacher, when the operation is completed or the operation is wrong, should accurately reflect the status of the operation result or the cause of the problem.

The figure 2 shows the reasons and proportion that may cause users to abandon the platform.

![Figure 2. Reasons to abandon platforms.](image)

From another point of view, these reasons are the main factors affecting the stickiness of the platform. According to the figure, the top 5 factors are quick response, clear navigation, simple steps, accurate feedback and consistent results.
**Strong Compatibility and Robustness**

From the existing learning platform, some have special requirements for the file format of resources; some have more restrictions on the size of resources; some have strong dependence on hardware; some have more conditions for supporting software.

These are poor performance of platform compatibility and robustness. In the stage of platform development, if these non-functional requirements can be customized, teachers can use the platform according to their preferences, so that it can avoid the corresponding problems.

**Self-adapt Students Individually**

According to the investigation, students wish that the learning platform can provide some functions of supervision and motivation in addition to the regular functional requirements of online learning, online homework and online questioning.

These requirements are closely related to the age of students, the initiative of learning, the ability to schedule, as well as the "intelligent service" provided by other applications that students have experienced.

**Adaption to Function**

According to the survey, in addition to the regular online learning function, students have more requirements for the "active" function of the platform, such as reminding, awarding and ranking, which is shown in Figure 3.

As can be seen from Figure 3, 54.38% of students wish that the platform can provide learning task reminders so as not to miss online learning tasks; 43.43% of the students hope that the platform can provide correction reminders to ensure the completion of the learning tasks, and also can help to check the omissions and fill in the gaps; This also proves that, to some extent, there are some deficiencies in learning planning for vocational college students, but about 45% of the students still hope to complete the learning task under the effective reminder help.

Also, 37.59% of the students hope that the platform can present the list of excellent assignments, 48.18% of the students hope that the platform can give them points awarding. Compared with the "hidden" acquisition of knowledge and skills, getting some visible "explicit" rewards is often more incentive for higher vocational students, and it is easier for them to have a certain degree of learning achievement.
In addition, 4.74% of the students also proposed other active functions that the platform needs to provide, such as "recommendation" and "sharing".

Among them, "recommendation" mainly refers that the platform can actively find the resources related to their personal needs from the huge learning resources according to their personal learning theme preferences, so as to expand their visual field or make the related theme learning more in-depth.

All in above, a highly active platform can gradually lead higher vocational students to develop good learning habits, produce learning achievement and self-confidence, and then form a healthy learning cycle.

Adaption to Time
In the era of Mobile Internet where "homogeneous" applications can be seen everywhere, applications are likely to be abandoned at any time, students' requirements for the timeliness of learning platform are much higher than before.

In the mobile net scene, the patience of students is very valuable. The platform should avoid making students face a static screen and wait for unknown results. No matter "finding resources" or "using resources", "submitting assignments" or "modifying assignments", "completing exercises" or "accounting scores", "viewing status" or "sharing achievements", students wish all of their work can be "fixed in seconds".

Learning Resources with AQHQ
AQ: Adequate Quantity
"Adequate Quantity" refers to the sufficient amount of learning resources in the process of blended learning. This paper discusses the requirement of quantity with the standard of "Instructional Resources Database of Computer Application Technology in Vocational Education", which was launched by the Ministry of Education in China in 2010, short for "IRDCAT" in the following content.

First, there should be various of courses, and the total amount of resources should have reached 50K as IRDCAT.

39 courses of learning resources have been developed, and about 40K courses resources have been gathered in IRDCAT. In addition, the total number of professional sub database resources and competition training resources is about 10K, which is used by professional person in charge, competitors and trainees in companies. The proportion of these two kinds of resources in IRDCAT is shown as Figure 4.

Second, they should be multi-faceted and widely used.

As mentioned above, in addition to the use of resources for teaching, the achievements of IRDCAT can also provide training for different groups such as enterprise employees and social learners, taking into account the needs of secondary vocational education, higher vocational education, application-oriented undergraduate education and social training.
Third, resources are abundant and fully support online learning.

The developed resources include video, micro lecture, PPT, animation, simulation, web courseware, document and other types.

All kinds of learners can browse resources without obstacles. Teachers and students in colleges and universities can make full use of learning platform to carry out professional education and curriculum teaching. Employees and social learners are allowed to make use of learning resources to carry out online education and training. Types and proportion of resources in IRDCAT is shown as Figure 5[2].

<table>
<thead>
<tr>
<th>Type</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses Resources</td>
<td>80%</td>
</tr>
<tr>
<td>Professional Resources + Competition Training</td>
<td>20%</td>
</tr>
</tbody>
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**Figure 5. Types and proportion of resources in IRDCAT.**

**HQ: High Quality**

"High quality" means that the content and form of learning resources can meet the needs of blended learning. This mainly indicates the following three aspects.

First, readability is strong.

"Readability" usually refers to the degree of attractiveness of the contents of books, newspapers, magazines or articles; it also refers to the value of reading and appreciation of books. The readability of learning resources in the IRDCAT platform means that the names of resources can effectively reflect the connotation of resources, the organizational structure is clear and reasonable, and the statements and demonstrations are accurate and scientific.
Second, the professionalism is outstanding.

"Professionalism" generally refers to the characteristics of having a very distinct specialty and a certain depth of professional knowledge, which means that not all people can easily start with. The resource specialization in the platform is outstanding, which means that the content of the resource can correctly reflect the professional technical knowledge or skills of the discipline in which it belongs. It is creative in form and different from other homogeneous resources.

Third, the effectiveness is obvious.

"Effectiveness" generally refers to the degree to which the planned activities are completed and the planned results are achieved. If the resources in the platform can effectively support the required courses and the individual resources have both independence and integrity, then it can be considered that the effectiveness of the resources is obvious.

**Instructional Design with IUE**

The purpose of instructional design is to enable learners to absorb the content to the maximum extent in a definite environment during a limited time, so as to solve the important and difficult points in the learning process better.

The IUE instructional design presented especially a scheme with interesting teaching organization, useful platform resources and effective learning evaluation.

First, soul—interesting teaching organization.

Compared with traditional teaching, students can learn and explore topics before class in the blended learning. Therefore, the teaching process has evolved from the traditional "review—introduction—propose objectives—explain and demonstrate—offline practice—question—summary" to "introduction online—determine questions—participate in discussions—test and evaluation"[3]. The interest of each link will affect the learning effect of students in different degrees. Specifically, the subjects needed to be introduced from the "introduction of guidance", the timing of "defining problems" and the depth of "problem", the form of "participating in deliberate", and the rules of "inspection and evaluation" should be considered.

Second, foundation—useful platform resources.

"No accumulation, no miles, no small streams, no rivers." Instructional design is not a passive water or a tree without foundation. If instructional design is to be landed, it is necessary to ensure that all links and steps are available. Therefore, useful platform resources are the basis of instructional design. In terms of form, resources with short time and precise content, such as micro lectures, are the best choice for the introduction of guidance; Presentation, supporting documents and other explanatory resources are conducive to the definition and interpretation of professional issues in the teaching process; Video, simulation and other visible and operable resources are conducive to theoretical research and practical learning; Exercise resources are helpful to realize the detection and evaluation. For the important and difficult problems, we need additional animation and other forms of teaching resources. In a word, teaching resources need to cover the whole process of teaching design.
Third, purpose - effective learning evaluation.

The "effective learning evaluation" means that the learning evaluation program can objectively reflect the degree of coincidence between the results of offline teaching activities and the expected objectives, the situation that students meet the standards, complete the teaching tasks and achieve the objectives in the classroom, and the degree of coincidence between the teaching objectives and the specific social and personal needs.[4]

Therefore, learning evaluation plan should not only consider the achievement of students' homework, but also consider the input and output process of teaching. The result of learning evaluation scheme is not only a number, but also a criterion to judge whether learning needs are satisfied.

Above all, the implementation of IUE instructional design will enable learners to use the necessary learning resources in a limited time and enjoy the personalized learning process, so that students can improve their own ability and meet the satisfaction of learning needs.

**Conclusion**

In summary, the "smart" platform with good user experience, the learning resources of "quantity and quality" and the IUE instructional design form the three fulcrum to promote the blended learning for higher vocational students.

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**References**


