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# Design and Analysis of Diversified Applications in Multimedia Foreign Language Teaching

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**ABSTRACT**

*This article mainly analyzes the application design of computer multimedia in foreign language teaching, aiming to improve the effectiveness and quality of foreign language teaching through diversified multimedia technology means. With the continuous development of computer technology, multimedia technology has been widely applied in the field of education, providing new teaching methods and means for foreign language teaching. This article will analyze the diversified application design of foreign language teaching from the perspectives of teaching design and application, and propose some specific suggestions and measures, in order to provide some beneficial references for the development of foreign language teaching.*

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**Keywords:** British and American Literature, Multimedia Teaching, Website, Application

## 1. Introduction

British and American literature plays a very important role in English teaching in colleges and universities in China. The English teaching syllabus for English majors in colleges and universities has a clear explanation: the purpose of literature courses is to train students' ability to read, appreciate and understand English literary works, and master the basic knowledge and methods of literary criticism [1]. Through the interpretation and analysis of British and American literary works, the basic skills and humanistic qualities of students have been improved, and the understanding of Western literature and culture has been strengthened. The function of this course is not only to improve students' English proficiency, but also to cultivate students' aesthetic ability and improve their literary accomplishment.Now, multimedia technology and network technology have been very mature, and they have already penetrated into our daily life, so the new teaching mode based on this form has become the current direction of education development [2]. Multimedia teaching website is designed by a variety of media, which aims at the publishing on the Internet or Intranet. Multimedia teaching website is based on the media technology of our new era for construction and design, and it can access the teaching site through the Internet. In order to realize the specific teaching plan,

it relies on the information network, and uses the multimedia means to display the website of the teaching content [3]. Therefore, multimedia teaching website usually includes multimedia elements such as voice, image, video, multimedia courseware and so on, which has incomparable advantages over traditional teaching methods in the efficiency and interaction of communication.

## 2. The Status

There are many difficulties in the course of teaching British and American literature. In the investigation of the teaching of British and American literature in colleges and universities, the research team of the foreign language college at Nanjing Normal University investigated and studied more than 50 different types of foreign language departments in China and analyzed and summarized the present situation of British and American literature teaching and the problems faced in teaching [4]. In class, foreign-language colleges and universities in China now offer courses in British and American literature with two classes a week. However, there is not enough time to study literature, and teaching tasks can't be guaranteed. Therefore, the British and American literature website learning, as well as the enhancement of their literary accomplishment, certainly can't meet the requirements in such a short period. In the teaching contents, methods and means, the report points out that more than 60% of teachers still use the traditional teaching mode, pay attention to the teacher's explanation, and have no high requirement for students' participation. When talking about a writer or a work, they begin with the background of the times and the life of the author, and then the content and artistic features of the work, which is easy to make the class atmosphere boring [5]. Because there is no interest in the class, and reading is not very active after class, it is very difficult to achieve the teaching effect.

Firstly, high efficiency is the most obvious advantage of multimedia teaching. Because of the complexity of literary historical data, the teaching process of British and American literature courses is very complicated, and many famous characters make it full of heavy work. Traditional classroom teaching methods can't convey so much information [6]. The sound, video and text of modern multimedia teaching can be organic, which can not only accelerate the progress of the course but also improve the students' interest in learning and the teaching efficiency effectively. In addition, multimedia-assisted instruction can also be used to design colorful classroom activities. When the professor explains a famous poem, he can ask the students to produce several slides to reconstruct the poem's scene, which also tests the teaching effect [7]. During this period, teaching can enrich the classroom activities so that students' attention and interest are fully attracted.

## 3. Methodology

Before the development of multimedia teaching websites, it is necessary to fully consider the difficulty of realizing the key technology of the multimedia teaching website, the feasibility of requirements of the network environment and the operating environment, and the feasibility factor of the budget of the multimedia teaching website, such as the development time. Multimedia teaching website is the function of specific teaching software, and modular design can be used for multimedia teaching, website maintenance and modification, new knowledge expansion, and new content updating [8]. Multimedia teaching methods and contents are more in line with the development requirements. In this paper, the *ThinkPHP* framework is used to develop *b/s*-based multimedia teaching websites for British and American literature so as to solve the problems of multimedia teaching in British and American literature teaching. The main functions of this website are knowledge base management, online learning management, online test management and website management.

### 3.1. Design Principle of the Website

In the multimedia teaching website design course, based on the B/S structure, it is necessary to follow the basic principles of a simple, efficient, and compact process, complete function, stable performance, easy maintenance, and cost savings. According to the powerful and manipulative design concept, the hierarchical thinking design, application layer and network are used to access these applications with different levels, the virtual platform layer, the software platform layer and the underlying platform layer, especially the position of each layer.

The level division of the website is clear and reasonable, which is beneficial to the realization of the website and the operation and maintenance of the website. In the face of core of the design concept of the entire web is the flexible scalability, functional configuration, and diverse display of styles. The following design principles need to be followed Object-oriented design: the core module of the product should be based on the object, so the design of each sub-module should adopt the object-oriented design idea so as to build an object-relation model and achieve the implementation, overloading and so on [9]. Service-oriented design: object-oriented design is the product kernel, but the interface layer needs to use service-oriented design, and the class interfaces and service interfaces are functions that all external interfaces should have. Design of multilayer structures: the module kernel of the product should refer to the design principle of the layered structure, which is divided into a data access layer, data logic layer, business logic layer, service appearance layer and interface layer from the bottom to top. According to the characteristics of the module, it can reduce the number of layers appropriately. Still, it should be divided into a data logic layer, a service logic layer, and an interface layer. The loose coupling and high cohesion design: the large modules of the product can minimize degrees of coupling and correlation, reduce dependencies and relationships between modules, and consider effective connections of each module [10]. Efficiency first design: each product module should consider efficiency first and adopt the method of "space changes time" in the database structure design. The data logic layer should be designed to minimise the correlation of multiple table data, and each layer considers caching to improve efficiency [11].

### 3.2. Architectural Principles of the Website

The website adopts a hierarchical design, which is divided into three layers: the presentation layer, the business logic layer and the data access layer. The presentation layer primarily addresses the interaction between the website and the user. The business logic layer mainly deals with user-related operations. The data access layer is mainly used to read and access the website database. The logical architecture diagram of the multimedia teaching website for British and American literature is shown in Figure 1.

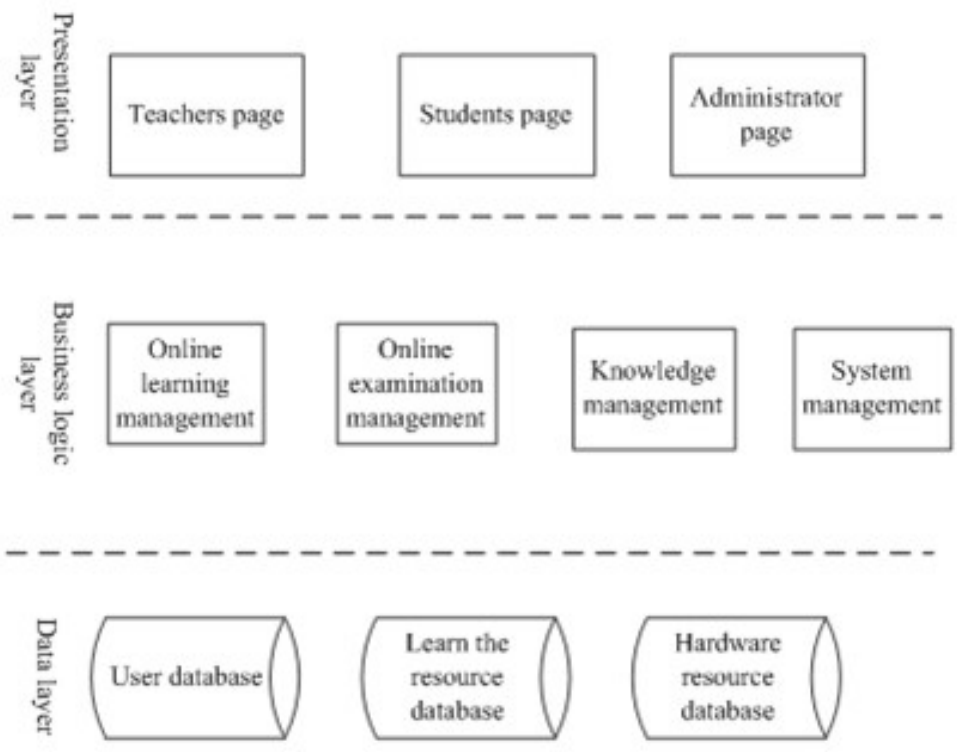


**Figure 1. System logic architecture diagram**

### 3.3. Functional Module Design of the Website

Multimedia British and American literature teaching websites mainly include the following main functions: knowledge management function, online learning management, online examination management, and website management.

The knowledge base's management function is used to manage knowledge, including the contents of the knowledge management, the knowledge map, and the knowledge recommendation. This function can add, edit, and delete directories, knowledge labels, knowledge contents, forms, and knowledge maps and make recommendations to user knowledge. The case diagram of use is shown in Figure 2.

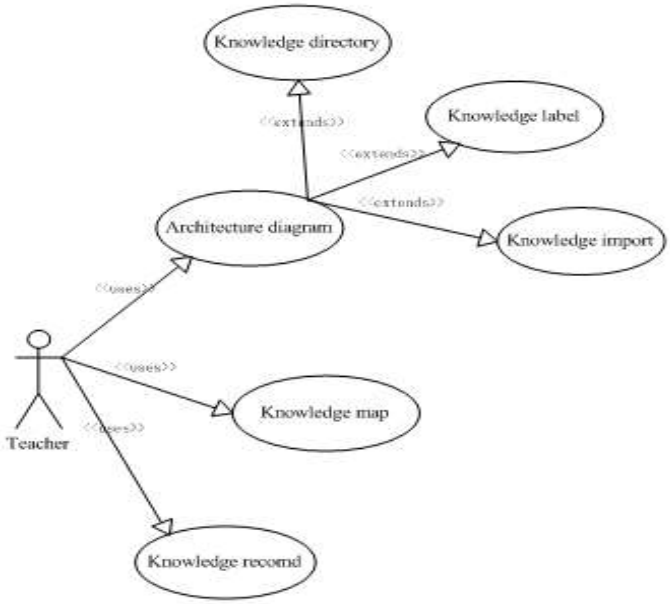


**Figure 2. Knowledge management functional use case diagram**

Online learning management includes course management, test management, curriculum management, learning processes monitoring, and result evaluation of the five modules, which can realize the creation and editing of online learning courses, student selection, student learning process monitoring and results evaluation, and other functions [12]. The case diagram of the online learning management function is shown in Figure 3.

The function of online examination management is to achieve online examination management, which mainly makes students to achieve self-testing on the study results through the web. Students should test the content of the course after they have studied the relevant teaching courses. Its main functions include four sub modules of problem bank management, paper management, examination management and examination result. Managers are trained to manage the question bank, such as importing questions, adding, editing, deleting, creating and publishing papers, arranging the test time of courses, do supervising and marking students' papers.

The website management module mainly realizes the website management function, which mainly provides the function for website administrators to set up and manage the website, including personnel management, role management, authority management, website configuration and resource management, and they can add, delete, and lock users. They also add and delete roles of sites, set permissions for roles, assign roles to specific users, and allow users to have permissions; what's more, they also set the global parameters of the site, such as organization name, website name, website identification, etc. [13]. Resources in a web site are managed too.

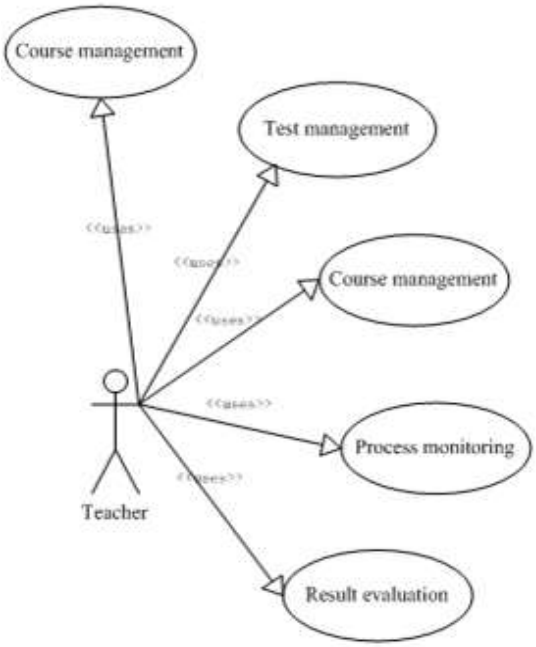


**Figure 3. Online learning management use case diagram**

### 3.4. Database Design of the Web

Database design is a very important step in the software design. Whether the design is scientific and reasonable will lead to the efficient operation of the software. Because of the users of the China Unicom Network Institute, the website needs certain processing power for data operation and management. At the same time, there must be some emergency response functions, such as real-time backup of database, rollback of database data and so on [14]. This ensures rapid recovery of raw data in case of data problems and it also ensures that the site is functioning properly. At the same time, the database site should ensure the high efficiency of data access, so as to improve the overall efficiency of the site. The website used in this study is a MySQL database with small size, fast speed and low cost. There are more data tables on this site, and a few important database tables are listed as follows.

Examination information sheet: the main fields are: number ID, examination time, examination subject and other fields.

| FieldName | DataType | Instruction | Key | Null |
|---|---|---|---|---|
| VacateID | int | Staff ID | Yes | Yes |
| VacateTime | varchar | Test time | No | Yes |
| VacateCause | varchar | Exam course | No | Yes |

**Table 1. Test information sheet**

Teaching resource information sheet: the main fields are: number ID, resource name, course number, location of resource storage, date of upload, resource extension, resource size, resource type, memo information and other fields.

| FieldName | DataType | Instruction | Key | Null |
|---|---|---|---|---|
| SalaryID | int(5) | Number ID | Yes | Yes |
| SalaryYear | varchar(20) | Resource Name | No | No |
| SalaryName | Varchar(20) | Course Number | No | No |
| SalaryNor | varchar(20) | Resource Location | No | No |
| OvertimePay | varchar(20) | Upload Date | No | No |
| SeniorityPay | varchar(20) | Resource extension | No | No |
| Bonus | varchar(20) | Resource size | No | No |
| Allowance | varchar(20) | Resource type | No | No |
| Deductions | varchar(20) | Note information | No | No |

**Table 2. Teaching resource information sheet**

## 4. Result Analysis and Discussion

### 4.1. Overview of Web Testing

Software testing is one of the most important steps in project construction, and it is a comprehensive and perfect test for the code developed before. By testing sites that have been developed, the existing problems or hidden problems of the code can be discovered, then the problems found can be repaired in time, and the regression test can be made. Through the test made over and over again, the code is constantly robust and stable.

Software testing is divided into 4 stages: the first stage is the unit testing, that is, the developer tests the modules written by himself; the second stage is the integration test, which means that the developer can test and transfer the external interface, and the site does not need integration test; the third stage is the website testing, which is to verify the function of the whole website by the professional testers according to the business requirements; the fourth stage is the acceptance test. Through the design of a large number of test cases, the functional modules of the website can be tested, and the relevant problems can be found in the process of testing, and the problems can be improved, so as to make sure that the site works in a normal operating environment. Finally, it can also simulate the actual use site of the user to achieve the purpose of project construction, and it can test the acceptance too.

### 4.2. Test Method of Website

Web testing means to test a site that has been designed, including the hardware environment, the network environment, the external device, and the supported software environment. The purpose of the test is to find vulnerabilities and errors at the lowest possible cost before the site is officially released to the web. It also means that the functions required by users have not been fully realized, so as to discover the inconsistencies or omissions between the sites and the user needs, and then a more reasonable solution is put forward to improve the quality of the site. There are two types of web testing: white box testing and black box testing. The white box testing method mainly treats the website as a transparent box, and tests the design structure of the website content and the interface of the website, so as to ensure that the design of the website meets the expected requirements. The black box testing rule is the opposite, and it regards the website as a black box, it tests the function module of the website through the design of some corresponding test cases, so as to ensure that the design of the site is in line with the expected requirements [15]. The multimedia British and American literature teaching website designed in this paper was mainly tested by using the black box testing. By using LoadRunner software, the number of tests was about 300 times. The final performance test results are shown in Figure 4. The more times the website sends, the more tasks the web would have to deal with. As the number of tasks continued to increase, performance would increase; within the highest limits, the capacity of the site would be steady, which did not have too much influence; and in the expected range, the value was 12.6.

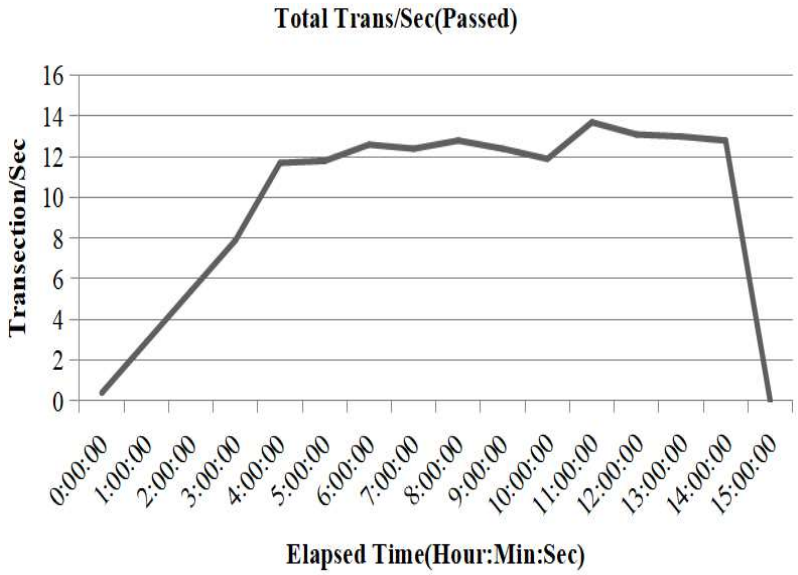


**Figure 4. Transaction volume per second**

| **Function** | **Test the user login process** | | | | |
|---|---|---|---|---|---|
| **Purpose** | **Verify the concurrency of the system when the performance is reached 200 times** | | | | |
| **Methods** | **Virtual maximum limit of 250 concurrent, minimum 50 concurrent test scripts** | | | | |
| **Concurrency** | **Average response time (seconds)** | **Transaction maximum response time (seconds)** | **Average transactions per second** | **Transaction success rate** | **Clicks per second** |
| 50 | 0.5 | 1.1 | 102.154 | 100% | 50.00 |
| 100 | 0.8 | 1.3 | 117.941 | 100% | 125.941 |
| 150 | 1.7 | 2.9 | 231.667 | 100% | 154.742 |
| 200 | 2.5 | 4.5 | 292.173 | 100% | 245.851 |
| 250 | 10.2 | 21.7 | 180.411 | 100% | 271.212 |
| Number of concurrent users | CPU utilization | Utilization rate of MEM | Disk I/O situation | DB parameter (M) | The other parameters |
| 50 | 7% | 4.53 | 451.319 | 3500 /400 | |
| 100 | 11% | 8.16 | 579.951 | 3500 /400 | |
| 150 | 13% | 12.32 | 671.532 | 3500 /400 | |
| 200 | 21% | 19.21 | 785.435 | 3500 /400 | |
| 250 | 40% | 31.13 | 800.233 | 3500 /400 | |

**Table 3. A test table that is concurrent with some users of the system**

The construction of the website generally needs to use a relatively stable MySQL database, and its purpose is to protect the stability of the site, so that the site has high operational efficiency in the process of running. Through the above analysis, the number of users in this site reached 300 in synchronous operations, and the running of the overall operation tended to be stable, which was in a controllable range, and the performance of the site met the expected use right. Depending on the requirements, a single business that responded to the site's single function needed a response time of less than 3 seconds, concurrent site was required in a range of 200. Part of the user's concurrent test structure is shown in Table 3. According to the above test results, when the number of concurrent sites reached 200, the average event response time was 2.5 seconds; the CPU occupancy rate was 13%, and the memory usage accounted for 19.21%. The average response time was compared with the transaction maximum response time, as shown in the table.

### 4.3. Test Result Analysis of the Web

The functional test cases of the site covered functional tests at multiple levels. The most prominent was the mobile platform of power marketing in all aspects, and the functional test results were obtained, as shown in Table 4.

| Function module | The total number of cases | The total number of defects | Resolved | Unsolved |
|---|---|---|---|---|
| Knowledge base management | 210 | 18 | 18 | 0 |
| Online learning management | 185 | 19 | 19 | 0 |
| Online examination management | 98 | 14 | 14 | 0 |
| Website management | 102 | 29 | 29 | 0 |

**Table 4. Functional test results table**

A total of 188 Bugs were found, of which there were no I-class Bug, 10 II-class Bugs, and 178 III-class Bugs; and through the tracking, debugging and regression testing on Bug, 118 Bugs were ultimately solved, so the functions of the site passed the test. The testing methods used in the software website should be applied to the website management according to the standards, and the development requirements of the website are pointed out according to different test results. Management level should be explained according to the general requirements, otherwise the function of the whole website can't be realized, and it can also promote the stable and safe operation of the website.

## 5. Conclusions

British and American literature plays a very important role in English teaching in colleges and universities in China. However, due to the progress of society, the former teaching methods have encountered many difficulties. Because of the complexity of literary historical data, the teaching process of British and American literature course is very complicated, and many famous characters make it be full of heavy work. With the help of multimedia technology in teaching, the efficiency of the course can be improved in the case of improving students' interest in learning. And because of the unique interactive characteristics, multimedia teaching has a leading advantage in the teaching of British and American literature and has an important application prospect. In this paper, a multimedia teaching website for British and American literature was designed to improve students' learning interest and learning efficiency; at the same time, in the design of British and American literature teaching website, the application of multimedia technology was firstly researched, and then targeted design was made; on the basis of full understanding of multimedia technology, and combined with the actual

situation of British and American literature teaching, the design of multimedia British and American literature teaching website was achieved, so as to greatly improve the operability and readability of the user and achieve the basic purpose of improving the teaching efficiency of British and American literature courses.

## References


[1] Feng, J., University, N. N. (2016). Application of multimedia technology in college aerobics teaching. *Journal of Hubei Correspondence University, 14*(1), 52-66.

[2] Xue, Q., University, B. (2016). Application of multimedia technology in the teaching of advanced mathematics. *Guide of Science & Education, 39*(1), 5-24.

[3] Wang, W. J., Wen-Hui, R., Shao-Bin, M. A. (2016). Application and practice of flipped classroom teaching in multimedia technology. *Journal of Lanzhou University of Arts & Science, 69*(1), 13-18.

[4] Tian, Y. D. (2016). Application of multimedia technology in fitter practice teaching. *Times Agricultural Machinery, 5*(1), 8-10.

[5] Zhang, J. F. (2016). Application of multimedia technology in high vocational mechanical teaching. *Times Agricultural Machinery, 21*(19), 2-6.

[6] Wei, J. (2016). Application of multimedia technology in orthopedics teaching. *China Continuing Medical Education, 38*(4), 473-505.

[7] Guo, X. (2017). The application of multimedia technology in digital electronic technology teaching reform. *Computer & Telecommunication, 22*(3), 362-399.

[8] Fei, L. J., Chen, Z. G., Cai, Y. Q. (2016). Application of multimedia technology in teaching of agricultural university. *Modern Agricultural Science & Technology, 21*(12), 2-6.

[9] Shi, S., University, T. (2016). Application of computer multimedia technology in high school art teaching. *Tianjin Science & Technology, 19*(02), 492-336.

[10] Wang, S. L., Computer, D. O. (2016). Research on universal type of multimedia technology and application course teaching. *Computer Knowledge & Technology, 23*(4), 3124-3127.

[11] Adler, M. D., Johnson, K. B. (2000). Quantifying the literature of computer-aided instruction in British and American literature education. *Academic Medicine: Journal of the Association of American Medical Colleges, 75*(10), 1025-1028.

[12] Zhong, W. (2015). The approach of British and American literature teaching system design and implementation based on J2EE campus network. *International Conference on Education Technology, Management and Humanities Science, 32*(22), 3449-3456.

[13] Pearson, R. E., Gibson, J. T. (2016). Experience with computer-assisted instruction in British and American literature. *American Journal of Pharmaceutical Education, 75*(7), 3901-3932.

[14] Setó-Pamies, D., Papaoikonomou, E. (2016). A multi-level perspective for the integration of ethics, corporate social responsibility and sustainability (ECSRS) in management education. *Journal of Business Ethics, 136*(3), 523-538. https://doi.org/10.1007/s10551-014-2494-3

[15] Barker, P., Skipper, T. (2016). A practical introduction to authoring for computer-assisted instruction. Part 7: British and American literature. *British Journal of Educational Technology, 25*(1), 59-74. https://doi.org/10.1111/j.1467-8535.1994.tb00360.x