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A Digital Class Adviser System for Education and Training Based on Artificial Intelligence and Robotic Process Automation

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Abstract: This paper presents the functional design of a Digital Class Adviser for education and training, drawing on the integration of a teaching and training big data system into the State Grid E-learning Platform. The design addresses routine administrative work, fragmented information, and the need for timely communication between class advisers and trainees. It combines a digital business platform enabled by artificial intelligence (AI) with robotic process automation (RPA). The platform integrates training resources and data, while RPA executes predefined workflows for trainee dispatch, attendance, evaluation, and examination. Supporting modules include optical character recognition, class group notifications, knowledge-based question answering, voice interaction, and report generation. The paper describes the information displayed in each scenario, the tasks assigned to software robots, and the review activities retained by class advisers. These functions are intended to reduce repetitive administrative work and improve the coordination of training activities. The contribution is a scenario-based system design; improvements in cost, efficiency, and learning outcomes remain to be established through empirical evaluation.

Keywords: Artificial Intelligence; Robotic Process Automation; Education; Training; Digital Transformation

1. Introduction

Cloud computing, big data, mobile communication, and artificial intelligence are increasingly used in education and training. Research on educational big data identifies opportunities for using institutional information to support teaching and management, together with challenges in its implementation [1]. In the State Grid training context considered here, integrating a teaching and training big data system into the State Grid E-learning Platform provides the basis for a smart campus. The original training arrangements nevertheless present three practical concerns. First, trainers and trainees may place different priorities on training. Uneven teaching quality and a mismatch between course content and workplace needs can weaken trainee engagement, while insufficient follow-up makes it difficult to judge whether training outcomes are applied. Second, routine administration involves many repetitive, rule-based tasks, and practical power training consumes tools, parts, and materials. Third, safety constraints can limit hands-on exercises to simplified or scaled-down operations. Administrative automation can address part of this workload, although improvements in practical instruction require changes beyond administration. A review of digital transformation in education also emphasizes the interconnected technological and organizational factors involved in adopting digital systems [2].

The Digital Class Adviser is proposed as a software assistant that combines AI capabilities with RPA to support training administration. Research on AI-based digital assistants provides a basis for considering their roles, opportunities, and limitations [3]. In this design, software robots carry out predefined operations, while class advisers retain responsibility for reviewing registration and scheduling decisions. This paper sets out the system's functional construction plan and the workflows for four training scenarios. Its purpose is to provide a design reference for digital training management rather than to report a controlled evaluation of deployment outcomes.

2. Overview of the Digital Class Adviser System

2.1 Concept and Characteristics of the Digital Class Adviser

The Digital Class Adviser combines AI services with RPA tools to assist class advisers in education and training. AI applications in educational administration, instruction, and learning have been reviewed in the literature [4]. Here, the proposed assistant uses these capabilities to support automated task processing, learning guidance, trainee interaction, and analysis of training data. The functions are organized around specific administrative workflows and the information needed by trainees and managers.

The assistant is conceived as a digital employee within State Grid's education and training activities. Its planned capabilities include analysis of business data, anomaly detection, and the invocation of AI services during complex processes. Self-learning and self-repair are development goals whose reliability would require separate assessment. Research on social robots in education offers a broader context for considering interactions between learners and automated assistants [5], although the system described here is a software assistant. Its administrative scope covers trainee dispatch, attendance, evaluation, and examination. The design coordinates people, business systems, and software robots so that routine operations can be automated and the progress of each process remains visible to class advisers.

2.2 Components of the Digital Class Adviser System

The Digital Class Adviser system consists of two main components: an AI-enabled digital business platform and RPA workflows for education and training. The platform manages resources, data, and interaction services; RPA performs the repetitive operations specified for each scenario.

2.2.1 Digital business platform (AI)

Business systems can exchange data through application interfaces or adapted connections to their underlying records. RPA provides another route by using software robots to interact with existing applications and execute repetitive operations [6]. In the proposed design, the Digital Class Adviser combines optical character recognition (OCR), natural language processing (NLP), computer vision, and RPA workflow models. Robot learning and digital process graphs are considered as capabilities for further development. The integration approach depends on the interfaces and access permissions available in each business system. Scenario workflows can be shared, and relevant personnel can be invited to complete their assigned activities online. By assigning repetitive, rule-based operations to software robots, the design aims to leave class advisers more time for training coordination and trainee support.

The digital business platform brings training resources, data tools, and applications into a common working environment. Research on digital platforms highlights the importance of defining their scope and understanding the interaction between architecture and organizational settings [7]. In this system, the platform supports learning services, data management, and workflow coordination. AI services assist with recognition, analysis, and question answering, while configured connections allow information to be exchanged between business systems. Whether a particular connection can be established without modifying the source system depends on its available access mechanisms.

The platform uses digital and Internet technologies to support information sharing and collaboration. It integrates training resources and business applications, providing a common data view and an interface for monitoring scenario workflows. Workflow management, automated task processing, and data analysis support daily training operations. Collaboration functions include file sharing, communication between staff and trainees, and interaction with software robots. Together, these functions are intended to reduce repeated handling of the same information across separate systems.

2.2.2 Advantages of the digital business platform

Data integration is necessary for the AI services and RPA workflows to use information consistently across training processes. Learning analytics research provides a basis for using learner data to support feedback and educational decisions, while also identifying limits in the evidence for improved study outcomes [8]. The proposed platform combines data connection, cleaning, controlled sharing, visualization, and automated processing. The following five functions describe how data are prepared and made available for the training scenarios.

Data integration and connection. The digital business platform connects and exchanges data by integrating with different systems and data sources. Through integration with RPA systems, it can interact directly with robots and consolidate data from different systems, thereby achieving data interconnection.

Data standardization and cleaning. The platform provides functions for checking data consistency and accuracy. Cleaning and transformation procedures are intended to reduce duplicate records and correct identifiable errors before data are used across systems and processes.

Data sharing and access control. The platform provides mechanisms for sharing data under defined permissions. Role management and access rules determine which records a user or software robot can view and process. These controls support the protection of trainee information during data exchange.

Data analysis and visualization. The platform provides data analysis and visualization functions that help users understand and use data. With these tools, it converts data into meaningful information and insights that support decision-making and process optimization.

Automated data processing. In combination with RPA technology, the platform achieves automated data processing and conversion. By defining automated tasks and rules, it allows robots to process data automatically, extracting data from one system or process and transferring it to another, thereby achieving automated data interconnection.

2.2.3 Development prospects in education and training business systems

The digital business platform is designed to support trainees' learning activities and managers' administrative work. Its learning functions include resource management, progress tracking, communication, assessment, analytics, collaboration, certification, and mobile access. Research on integrating mobile devices with teaching and learning informs the inclusion of mobile access [9]. The planned functions are described below.

Learning content management. The platform allows managers to upload, edit, and publish learning content, including course materials, video tutorials, and exercises. It provides a centralized management platform through which managers organize and update learning resources to form a systematic knowledge graph.

Learning progress tracking. The platform tracks trainees' learning progress and activities, recording their learning time, completion status, and achievements, so that managers can understand trainees' learning situations and provide timely feedback and support.

Trainee support and interaction. The platform provides channels for trainee support and interaction. Through the platform, trainees can communicate, ask questions, and hold discussions with teachers, other trainees, and robots, which promotes the formation of learning communities and the development of cooperative learning.

Testing and evaluation. The platform provides online testing and evaluation functions for assessing trainees' learning outcomes. It can automatically score trainees' answers, generate performance reports, and provide feedback and suggestions to help trainees improve their learning outcomes. After each training class, it automatically generates a class evaluation report that provides training data for class advisers.

Learning data analysis. The platform collects and analyzes learning data and provides data reports and analysis results. Through data analysis, managers can understand trainees' learning behaviors, trends, and needs, adjust teaching strategies, and provide personalized learning support.

Social learning and collaboration. Through social learning and collaboration functions, the platform encourages cooperation and knowledge sharing among trainees. It provides discussion areas, team projects, and online collaboration tools to promote interaction and mutual learning among trainees.

Advanced learning and certification. The platform provides advanced learning and certification mechanisms, offering more advanced courses and learning opportunities for trainees. Trainees can choose advanced courses according to their own needs and interests and obtain corresponding learning certificates or certifications to improve their professional abilities and competitiveness.

Mobile learning support. The platform is compatible with mobile devices and supports learning on mobile phones, tablets, and other mobile devices. Trainees can access learning content and participate in learning activities anytime and anywhere, which improves the flexibility and convenience of learning.

2.2.4 RPA in the education and training process

RPA uses software agents to carry out operations in existing applications, commonly by reproducing user actions. A structured review identifies both opportunities to reduce routine workload and challenges in applying RPA [10]. In this system design, RPA is assigned to trainee dispatch, attendance, evaluation, and examination workflows. The following section specifies the information presented to class advisers and the operations performed under predefined rules.

3. RPA Scenario Design

This section describes four RPA scenarios: trainee dispatch, attendance, evaluation, and examination. Each scenario combines a display of current process information with automated operations and the review activities specified for class advisers.

3.1 Trainee Dispatch RPA Scenario Design

The trainee dispatch page follows the sequence from publication of the training plan to final class scheduling. It displays plan release, registration notices in regional WeChat groups, registration status, deadline review, class division, and scheduling review. The page draws on the education and training big data platform and the person-position-course platform. Icons, buttons, and progress bars show the status of each stage so that class advisers can review registrations and scheduling proposals alongside the robot's automated operations.

The trainee dispatch visual display page presents the following content.

Automated release of the training class opening plan. The page can display a class opening calendar icon that marks the date and time of the plan release. On the scheduled date, the robot automatically executes the class opening plan and presents detailed information about the training class, such as the course name, time, place, class size, contact person, and class group QR code.

WeChat registration notice. The page displays a WeChat group message bubble icon that indicates the delivery status and content of the notice. After the class opening plan is released, the robot automatically posts the plan to regional WeChat groups and displays the content of the notice, so that trainees can learn about the class opening plan and how to register.

Real-time notification of registration status. The registration icon on the page is updated in real time and displays the registration status list, so that trainees and managers can check the registration status at any time. Different icons or colors indicate the registration status of trainees in each training class, such as registered, pending review, and reviewed. At rule-based time points, the robot periodically publishes real-time registration information for each training class in the group, including the number of registrants, the planned class size, the number of remaining places, and the registration deadline. When registration for a training class is full, the message notification stops and the process moves to the next stage.

Registration deadline review. The page displays a review button for the training class registration deadline, through which class advisers conduct review operations. Class advisers can view the registration status on the page and approve or reject trainees' registration applications.

Automatic class division module. The page displays a class division module in which training classrooms are shown as icons. According to the nature of the course, the number of registrants, and the number of trainers, the robot automatically generates class division plans for class advisers to choose from. The page can also display lists of opened and unopened classes, together with the number of registrants for each class.

Scheduling deadline review. The page displays a review button through which class advisers conduct the final review. Class advisers can view the scheduling results on the page and approve or adjust them. After scheduling and class division are completed, the robot automatically synchronizes the class division results, trainees' seats, classes, and training locations to the class group.

3.2 Attendance RPA Scenario Design

The attendance page presents the three-daily-check-in policy, attendance notices, current statistics, and make-up attendance arrangements. Class advisers use the display to monitor attendance, while the robot sends notices to the class WeChat group according to the configured times. Attendance information is obtained through the education and training big data platform and the person-position-course platform. The page includes the following functions.

Display of the three-daily-check-in policy. The

page clearly displays the three-daily-check-in policy, including the requirements and time limits for the three daily check-ins.

Attendance message notification. An attendance message notification module is displayed on the page so that managers can see the start time of attendance and remind trainees to check in on time. The robot automatically updates attendance messages in real time to ensure that attendance notices are accurately delivered to the WeChat class group, and it sends attendance information to the class group at regular intervals according to the time policy.

Attendance statistics display. The page provides an attendance statistics module that displays in real time the number of trainees who have checked in and the number remaining. It also displays the attendance rate as a percentage, allowing managers to understand class attendance at a glance.

Attendance data generation and sending. The page provides an attendance data module that shows each trainee's attendance status and number of absences. Managers can view and export attendance data at any time for statistics and analysis.

Trainee make-up attendance arrangement. The page provides a make-up attendance module that allows managers to arrange make-up attendance for trainees who have not checked in, according to the actual situation. Managers can mark the information of these trainees and the make-up attendance time on the page.

3.3 Evaluation RPA Scenario Design

The evaluation scenario combines scheduled notifications, questionnaire completion, and generation of individual and class reports. Evaluation data are displayed as responses are collected, allowing managers and class advisers to review completion status and reported results. The education and training big data platform and the person-position-course platform provide the underlying information. The scenario includes the following functions.

Visual real-time display. The visual display page presents various data and indicators of the evaluation scenario in real time, using charts, tables, and statistical data to show evaluation results and trends intuitively.

Robot automated execution. A robot is configured to automatically execute tasks and notification operations in the evaluation scenario. The robot can trigger evaluation notifications at scheduled times, sending evaluation links and deadlines to the WeChat class group, and it automatically publishes the numbers of trainees who have and have not completed the evaluation, issuing notifications according to time rules.

Trainee evaluation questionnaire completion. Trainees open the online evaluation questionnaire through the evaluation link and fill in the evaluation items, which can cover attendance status, academic completion, teacher evaluation, course preferences, and improvement suggestions.

Individual evaluation report generation and display. Based on the questionnaire data filled in by trainees, the system automatically generates an individual evaluation report for each trainee. Trainees can access their own reports through the system to view their evaluation results and comprehensive evaluations across different dimensions.

Class evaluation report generation and display. Based on the evaluation data of all trainees, the system automatically generates a class evaluation report. The report comprehensively evaluates the performance of all trainees and visually displays the overall evaluation situation and data of the class.

Real-time data update and trend analysis. The visual display page updates evaluation data in real time and provides data trend analysis functions. Managers and class advisers can view changes and trends in the evaluation data at any time for real-time monitoring and analysis.

3.4 Examination RPA Scenario Design

The examination scenario connects test paper import, examination information maintenance, personnel allocation, room maintenance, scheduling, monitoring, and result analysis. Automated operations transfer the information required at each stage, while the display shows examination arrangements and progress. The design draws on the education and training big data platform and the person-position-course platform and includes the following functions.

Visual display. A visual display page is designed to present the stages and data of the examination scenario. The page can include modules for test paper import, examination maintenance, examination personnel arrangement, examination room maintenance, examination arrangement, examination monitoring, and examination result import.

RPA execution. A robot is used to automatically execute tasks and operations in the examination scenario. According to preset rules, the robot can automatically import test papers, import examination maintenance information, arrange examination personnel, maintain examination rooms, and arrange examinations.

Test paper import. Test papers are imported through Excel, which brings the test paper content into the system. The system associates each test paper with basic examination information for subsequent examination maintenance and arrangement.

Examination maintenance import. The robot imports the examination plan and basic information such as the examination time and place. The system automatically associates the test papers with the basic examination information to ensure the integrity of examination preparation.

Examination personnel arrangement. Examination personnel are arranged according to the robot's settings, including trainee information and examination time arrangements. According to this arrangement, the system automatically allocates trainees to the corresponding examination rooms and time periods.

Examination room maintenance. Relevant information about examination rooms, such as the room name and the number of seats, is set automatically according to system data. The system imports the examination room information and associates it with the corresponding examinations and examinees.

Examination arrangement. The robot arranges examinations, examination sites, and examination personnel. According to the arrangement, the system automatically sends WeChat group messages to trainees to remind them of the relevant examination information.

Examination monitoring. Data during the examination, such as examinees' answering progress and examination time, are monitored. After the examination, the system summarizes the monitoring data and reports them to the class adviser.

Examination result system. The system can analyze results on the basis of examination scores and supports exporting the analysis results.

4. AI Digital Class Adviser Assistant Function Modules

The Digital Class Adviser assistant supports the four RPA scenarios through OCR, workflow execution, WeChat group services, a template knowledge base, question answering, interaction, and report generation. A knowledge graph provides a means of organizing learning resources within the platform. These functions use the education and training big data platform and the person-position-course platform described above. The principal assistant modules are as follows.

OCR recognition. The digital employee can use OCR technology to recognize and extract text content from documents and pictures. It can recognize and extract text from paper documents and images for subsequent processing or storage.

Education and training scenario execution. The digital employee executes repetitive tasks according to preset rules and processes. It can process, import, and clean data and transfer records between business systems. These operations support the training workflows described in Section 3.

Class group message notification. The Digital Class Adviser can automatically publish notices and reminders in class WeChat groups. According to preset rules, it can automatically send class-related information, such as class opening notices, course change notices, and examination reminders.

WeChat group binding. The Digital Class Adviser can be bound to designated WeChat groups to interact with trainees. Through dialogue with trainees, it can provide information, answers, and services and respond to trainees' questions.

Template knowledge base and Q&A reply. The Digital Class Adviser uses a built-in template knowledge base to answer trainees' questions. NLP supports the matching of questions to relevant entries, from which the assistant returns an answer, suggestion, or solution. The quality of the replies depends on the knowledge base and the accuracy of the matching process.

Human-robot interaction and voice interaction. The Digital Class Adviser can interact with trainees to understand their needs and provide corresponding support. Through voice recognition and voice synthesis technologies, it enables more natural and smooth voice communication and interaction.

Data analysis and report generation. The Digital Class Adviser has data analysis capabilities and

can generate reports and analysis results based on trainee and class data. It can analyze data such as trainees' grades, learning progress, and participation, and generate corresponding reports and statistical information.

5. Conclusion and Outlook

This paper presents a Digital Class Adviser design for education and training in the State Grid context. The system combines an AI-enabled digital business platform with RPA workflows for trainee dispatch, attendance, evaluation, and examination. OCR, group notifications, knowledge-based question answering, interaction, and reporting support those workflows. The proposed division of work assigns repetitive operations to software robots and retains registration and scheduling review by class advisers. This arrangement is intended to improve coordination and reduce routine administration. The paper does not provide comparative measurements of cost, efficiency, or learning outcomes, so these expected benefits should be treated as objectives for subsequent evaluation.

Future work should examine the reliability of the AI services and RPA workflows in more complex training settings and assess whether the design can be extended to other educational contexts. Further integration with educational data may support more targeted services, but its value should be tested against clearly defined training needs. Evaluation should measure administrative workload and training outcomes and consider privacy, access control, and the handling of errors. These steps are needed to determine how the proposed assistant performs in practice.

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