

## **Redefining Education Landscape with Robotic Process Automation**

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### **Abstract**

*World revolves with a focus on how things can be automated for more productivity. Robotic Process Automation (RPA) helps in the fruitful utilization of valuable man hours by allowing software robots do mundane tasks. The implementation of RPA in many universities across the globe is incrementally increasing with realization in automating admissions, teaching and examination processes. This paper shows how robots help redefine education by several use case analysis. An instance of software robots is deployed to help faculty to efficiently communicate the progress of students with parents. The robot structures the data similar to a hard copy of the progress report and forwards the compiled file. The automation was performed over individual student's data gathered for progress report generation. The result shows how simple and efficient is the RPA to handle repetitive tasks and are done more accurately compared to manual process.*

**Keywords:** *RPA, software robot, progress report*

### **1. Introduction**

Digital technologies for operational efficiency are not new to the field of education. Vendors like Blackboard, Impartus etc. have been there for a while offering digital solutions for education like virtual learning, lecture capturing, virtual classroom and so on. But there has been a dearth to automate mundane and repetitive tasks which could help Administrators, Professors, Teachers and Students to concentrate more on creativity and productivity [3]. This breakthrough technology could potentially be Robotic Process Automation or RPA. Having proved its success in several domains like health, insurance, banking and others, RPA is now a mature solution that organizations look forward to embrace [10]. Though Educational domain is a rookie in line to tap the benefits of process automation with software robots, its few implementation case studies in workflow automation and data digitization have proved its worth [6]. Of the n numbers of verticals in the software industry, a new entrant is Robotic Process Automation (RPA) which helps

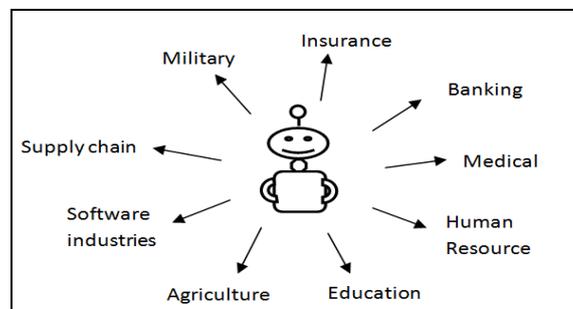
IT industry to reduce the work of employees to concentrate more on new and innovative ideas. In the early 2000s Blue Prism was the first company to introduce RPA into the market. Later, other companies like UiPath, Inflectra Rapise, Automation Anywhere, Pega, Contextor and Nice Systems have joined the crew. Industries trust automation results 100% in comparison to manual work for repetitive tasks. Automating cyclic processes save employee's time and gains profit for their industries in a short span. This in turn helps the industry to concentrate more on higher-value task and improve resource management [1]. Both software and services can be automated in real time. It is predicted that the global robotic process automation market size is expected to reach USD 10.7 billion by 2027, expanding at a CAGR of 33.6% from 2020 to 2027 [17].

### 1.1. Types of RPA

RPAs are of three different types; First one is Attended Automation, second is Unattended Automation and the third one is Hybrid Automation [14]. In Attended Automation, software robots can work together with humans and share the space and workload in real time. When humans start collaboration with robots, work done can be much faster with minimal errors. Herein robots are deployed to handle unexciting, monotonous tasks and free employees to focus on cognitive work. Next is the Unattended Automation, which is chosen for more complex and vastly repetitive processes, usually for tasks performed in batches. This is determined based upon the framework of the respective application. Additionally, Unattended Automations are more preferred for privileged operations, requiring superior permissions and credentials. Hybrid automation [18] is the combination of attended and unattended robots. Front end inputs and backend processing is handled in tandem with a scope of end to end automation of complex workflows. The reservation of robot depends on the need of the application. Figure 1. is about the broader application areas where RPA can be implemented to unleash its potential to handle repetitive tasks.

### 1.2. Advantages of RPA

The major benefits of RPA adoption in an organization as outlined by Neeru Jain are Enhanced Commercial Outcomes, Reduced Costs and Operational Risks, Reduced Paper Use/Waste to Decrease Output Variability, Improved Employee Engagement with Better Customer Experience. Also, RPA implementation does not require new IT Infrastructure. Other features include Flexibility and Simplicity, Analytics and Insights, Faster Service, Highly Scalable, Security of Virtual Workforces, Driving Process Improvement, Enhanced Capability for SLA Scrutiny, Well-defined Governance Arrangements, Removes Client's Pain Points, and Being a Trendsetter.



**Figure 1. Broad application areas where RPA can be implemented**

### **1.3. What relevance does RPA hold for educational institutions?**

Robotic process automation is defined as the automation of work processes with software that utilises user interface and machine learning capabilities to handle mundane, repetitive and often time consuming tasks. RPA allows organisations to handle their day today businesses more efficiently with automated “Bots” or “Robots” mimicking user’s action to fulfil cumbersome, monotonous and iterative tasks.

Bots prove to be effective in that they enhance productivity with stakeholders performing more tedious, knowledge based functions while leaving the robots as a virtual workforce to do humdrum, exhaustive processes with minimal or no human intervention. Data editing, screen operation and other tasks by means of RPA do not involve physical manipulation of devices such as keyboard and mouse, and therefore tasks can be accomplished much faster. The business processes could be automated with minimal or no errors. Industrial research has shown that RPAs drive the organisation with financial savings of 20% to 50%, improving the accuracy and operational efficiency. According to McKinsey,

Organisations that deploy RPA across their processes especially in support of the many small tasks inherent in most workflows can achieve up to 200% ROI in the first year. RPA provides a low cost, speedy and efficient way to realize the goals of digital transformation. RPA is deployed over the current IT infrastructure, is lightweight and offers a frictionless approach to digital transformation [11]. UiPath claims that RPA helps to create more efficient digital workflows which improve data quality. According to Deloitte, Robotic Process Automation (RPA) uses software, to capture and interpret existing IT applications to enable transaction processing, data manipulation and communication across multiple IT systems [12]. Its Annual Robotics Survey, with responses from over 400 individuals across industries shows that awareness of robotics is high and that even more companies and institutions have investigated RPA opportunity and/ or built a proof of concept. Many of the RPA vendors provide tools with simple drag and drop option to automate workflows. Hence coding is not always a prerequisite to adopt RPA technology [16].

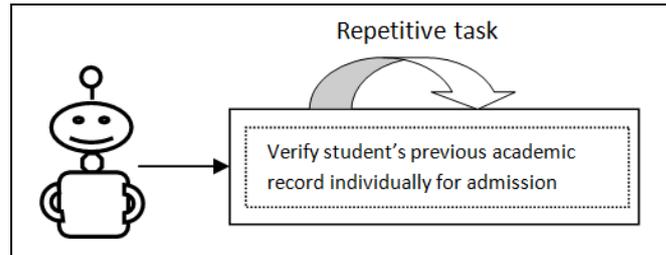
RPA automates tasks and are no substitute to human intelligence. Bots can fill out documents, do cross-functional and cross-application macros, read and send emails, log into web/enterprise applications, move files and folders, copy and paste, fill forms, read/write databases etc. Bots thus facilitate the processes carried out by humans [7]. Human intervention and decision-making augment RPA. The ethical factor of RPA is that it not only accelerates the system but takes the time-consuming tasks out of human hands, frees them up to do more cognitive and value-added work. The economic value of a task may only be completed by the involvement of a human [13].

Today, RPA has advanced to process huge volumes of data, with numerous steps and approval principles from end to end. Several industries have leveraged RPA to streamline enterprise operations and reduce costs. Going forward RPA could augment with artificial intelligence or AI for refined decision making [4]. For example, AI system can identify processes to automate, which is done by recording and analysing the keystrokes from user’s device.

## **2. Data Volume during admission**

In educational institution like schools, colleges or universities huge volumes of data are collected during the admission process. This work is tedious, repetitive and time consuming, hence an ideal selection for RPA. The normal workflow of admission

procedure involves the following steps: Data entry operator who sits in the front end collects the details of the candidate and checks it with the official database of the student's record in the repository of the previously studied institution. Background verification takes longer time with staff over burdened during seasonal peaks. Work includes checking the name, registration number and the respective marks, conduct etc. This task is performed iteratively for every admission application. Implementation of bots in this scenario as shown in Figure 2. proves to be effective in handling repetitive task and efficient handling of the scarce resource - time needed to check the respective marks of the student with other academic records. Onboarding becomes a better experience for all the stakeholders- staff, students and parents.



**Figure 2. Robot in Student's admission process**

Few of the benefits outlined by Neeru Jain are discussed in the scope of educational field [20]. RPA helps in finding the right people for the right job. The robots that were created could help sort out the skilled person from a specific domain by checking the data of every staff/student in the database. This comprehensive task could now be accomplished with a few clicks of robot deployment. The cost needed to create a robot is lesser when compared to humans for the same job. Initially the procuring cost and training needed for the staff members in that specific domain may be high, but it can be harmonized on the frequency of the need of the same job. The operational risks are also reduced in terms of error free results in automation. The biggest bio threat, wastage of paper for unnecessary works is efficiently handled. Since the communication between the staff and students takes place through digital medium[5]. Since automation is error free, the process of calculating marks and attendance percentage is made simple. Employees inside the institution can be utilized for more fruitful and innovative work rather than repeat rule-based tasks. This in turn works beneficial for the students as they get more time to discuss their subjects with the teachers.

One of the best feature of RPA is that a person needs only a little programming knowledge for writing codes to automate a process. This could be repeated for similar processes too. Thus RPA is simple to learn and implement. Students data, Institutional data can be analyzed in the way we want to. RPA thus helps to simplify the steps and analyze the accurate results. The analytics could be processed for further planning and implementation for the benefit of students and the institution. Set of tasks can be completed in a short-span and in a precise manner. There is a high probability for human errors in handling the students data especially when there is an urgency of task completion. To avoid such pitfalls and increase accuracy in segregating the results, RPA is the effective tool. Student applications with large volumes of data can be scaled up by updating the database alone. There would be only a few changes in the automation process to acquire the results [2]. Scaling the robotic process to all the sister concerns of an educational institutional becomes an easy task too. The important output of any process is an error free product. The analytics obtained using the robots help monitor students activities in a detailed manner, there by staff members could give special attention to a particular student. Adopting new technologies to effectively fulfill our needs

makes us pioneers and is often a good step to progress. Producing good results with better workflow automation and happy end users is what we need at the end of the day. This could be achieved with the help of RPA technology [15].

### **3. Case Studies**

#### **3.1 Australian Public Research University**

An Australian public research university used AssistEdge RPA platform to automate high-touch, high-frequency processes involving more than 50,000 students and 3,000 academic staff across multiple locations. The implementation focused on automating student scholarships, progress reports, leave delegation, staff movement, and on boarding. A major problem was backlogs during peak periods. Robots were deployed to automate transactions unassisted. The solution resulted in an annual processing of 8000 transactions and improved processing time to 50% [8].

#### **3.2 University of Melbourne**

The University of Melbourne implemented RPA within their internal operations. Robots were deployed within the finance department for invoicing and supplier records. The throughput rate in processing supplier details increased to 97% [19].

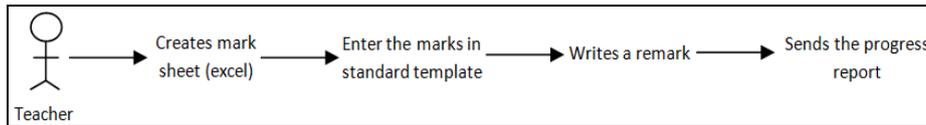
#### **3.3 University of Sydney**

The University adopted automation to improve service levels of staff and students, release staff time back to the business and reduce risks. The RPA with Blue Prism platform started out to automate 33 processes across six functional areas which included Student Administration Services, Finance, Campus Infrastructure, Human Resources and ICT functions. A range of in-house processes across various business units were automated to maximize visibility and include a range of stakeholders. Functions delivering real value like estate management (space bookings), student administration, procurement, exam management, document verifications, etc were identified and automated with RPA. The immediate impact was service improvement with enhanced student and staff experience. The University is now piloting the use of AI to augment RPA solutions [9].

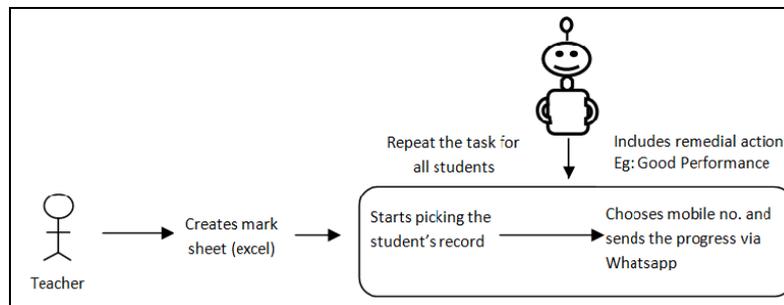
### **4. Progress Report Updating**

Parents are eager to know their ward's progress and overall development. It is the role of every teacher to effectively communicate and keep them updated. Generally the status update is given via SMS, email or by post. The process of sending the detailed progress report to the parents manually for each and every student consumes much longer time than the data collection itself. The steps involved in this process are: Firstly, the class teacher has to create a file with the marks scored by every individual student in a preferable format (it may be excel, pdf). Next the teacher has to select an individual student's record and carefully format it into a separate standard template that the institution follows. Then the corresponding address details of the student is copied and pasted in the address bar. Finally, the compiled progress report with marks and attendance details is sent as an SMS to the parent's mobile number with the help of a local server that the institution maintains (Management Information System - MIS). In Figure 3. the process is defined diagrammatically.

Figure 4. Illustrates how the same function is performed by a software robot. Herein the teacher has to just create a mark list in a preferable format (excel) and the rest is taken care by the robot. UiPath community edition studio has been used to implement this application. UiPath is one of the leading automation tools in the software industry. The advantages of UiPath are increased compliance, non-invasive nature and compatibility with existing systems. The platform also assures better management with improved customer experience. Several software industries and insurance companies prefer UiPath tool for end to end workflow automation. Whatsapp mobile application, the globally popular messaging app has been used to send the progress report



**Figure 3. Progress report of students sent to parents manually**



**Figure 4. Progress report of students sent to parents via RPA**

The Robot created using UiPath tool will accept excel file as input, which consists of the students mark list with the mobile numbers of the parents. The robot starts reading each record from the mark list and converts it into an understandable format with a standard template. The template consists of details like subject name, percentage of marks and the current attendance. Once the progress report is standardized the robot starts sending it as a Whatsapp message to the respective parent. A remark of the student's performance in each subject is also included. The robot automatically chooses a relevant remark and amends it with the Whatsapp message. The robot fetches every record of the students in the excel file and iterates the process until the last record. UiPath's Orchestrator has been used to deploy, trigger and track the robot. We could thus monitor and manage the application through the browser or from the mobile devices. Issues of power failure or network fault are handled by the UiPath Queue. It is a container which holds a list of items to be processed by robots. A failed transaction can be reprocessed in the queue. RPA bots can be scheduled with the help of a scheduler. The parents' contact was not saved in the mobile while implementation. Instead Whatsapp web application was used to send out the SMS. Steps to access Whatsapp web: Open the web browser and then paste the URL in the address bar of the browser- <https://wa.me/xxxxxxxxxxx>' (where x indicates mobile number). The created robots help faculty throughout the year, after every examination they need to just update the excel file with a few clicks, the remaining process is being taken care of by the robots.

## 5. Experimental Result

Figure 5. Shows the logic flow sequence by which the robot is implemented in the UiPath studio community edition. Figure 6. Shows the excel file of the mark list. This includes the students' marks, attendance percentage, and mobile number with logic for report card remarks. Progress report sending was tested real time in our institution. The analytics inferred for a group of 3360 students, shows that the robot took 168 minutes to complete the task. i.e., for every student the robot takes ~ 3 seconds on the whole to fetch the marks from the excel file, standardize format, add the performance remark, get the Whatsapp number and finally deliver the message. If this task was processed manually, it takes ~ 14 seconds for every student, for 3360 students it sums up to 784 minutes. The result shows a ~78.5% decrease in the processing time and most importantly the manual errors are avoided with RPA implementation.

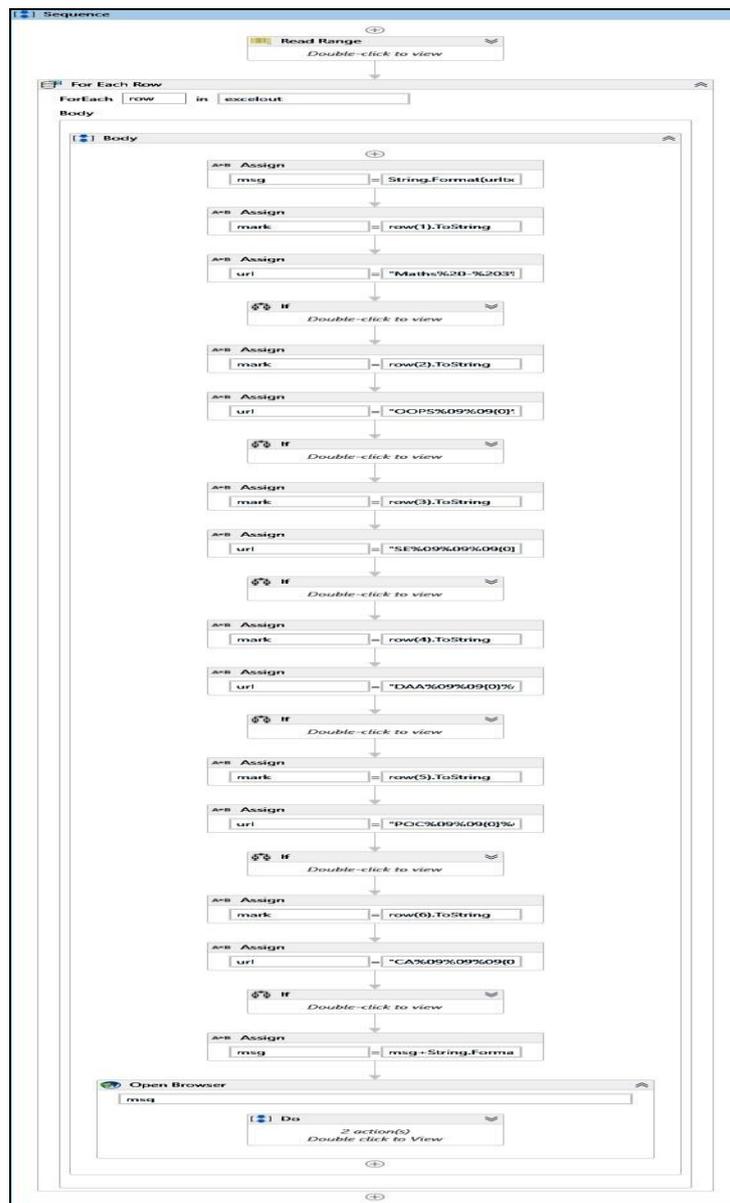


Figure 5. Sequence of events in Robots

S.NO	REG.NO	NAME	MATHS-3	OOPS	SE	DA	POC	CA	ATTENDANCE %	PARENT'S WHATSAPP NO.			
1	1518106001	AAKASH S	64	47	27	53	86	65	78	919043000000			
2	1518106002	ABISHEK M	79	26	83	88	21	96	94	919662310000	$x < 40$	Poor	
3	1518106003	ABISHEK S	45	47	27	53	86	65	78	919043000000	$51 > x > 75$	Needs improvement	
4	1518106004	ABISHEK VASANTH K	59	93	65	20	54	58	67	919669000000	$75 > x$	Good	
5	1518106005	AHMED ABZAL A	51	62	83	36	69	34	87	918940078000			
6	1518106006	AKASH R P	42	82	54	75	91	61	97	919668770000			
7	1518106007	AKASH RAJ R K	93	27	60	56	29	71	65	919164747000			
8	1518106013	BALAJI M	20	68	90	37	89	92	45	919025996000			
9	1518106015	CIBI BABU R	86	52	48	47	55	66	90	919344894000			
10	1518106016	DEVADHARSHINI R V	22	19	59	95	94	55	75	919942040000			
11	1518106016	DHARSHINI S	78	23	31	85	24	50	67	919597430000			
12	1518106019	DHIVAKAR K C	29	74	75	69	55	74	90	919952280000			
13	1518106021	DHIVYA S	81	17	90	32	84	95	87	919669490000			
14	1518106022	DHIVAKAR A	64	57	82	62	23	42	76	919500038000			
15	1518106023	EZHILVELAN S	43	94	89	16	73	41	63	917010825000			
16	1518106024	GAYATHRI K	63	66	63	72	47	38	75	919043062000			
17	1518106025	GOKULADHARSHINI S	65	64	87	77	84	81	76	919666924000			

Figure 6. Excel file of students mark list

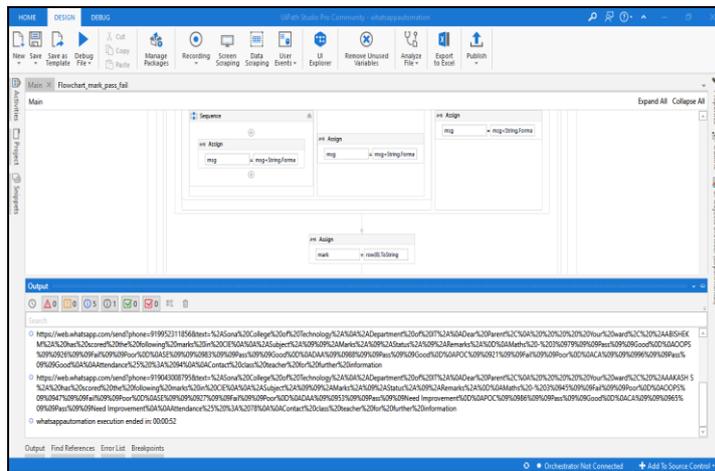


Figure 7. Execution of events in UiPath studio

Figure 7. shows the order of execution of events by which the robot was built along with the log file. The progress report sent by bots to the parents by Whatsapp is shown in the Figure 8. The execution time taken by the robots relies heavily on the internet bandwidth of the network provider. The stronger the signal, the quicker the execution of robots will be. The work efficiency comparison between the robot and human is shown in the Figure 9.

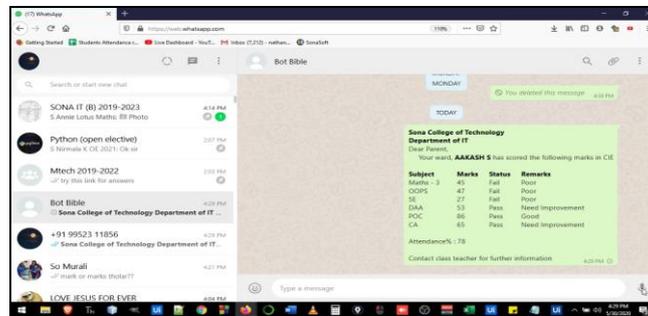
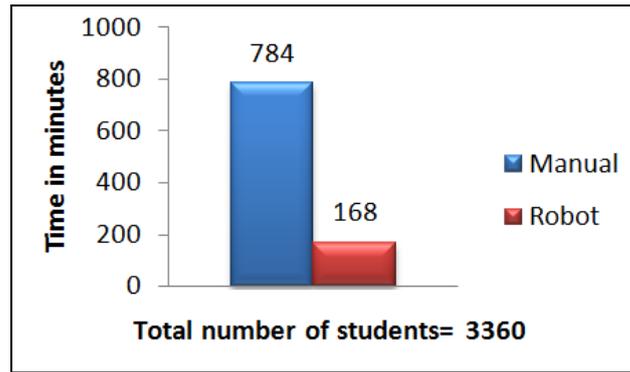


Figure 8. Screenshot of Whatsapp message delivered to parents



**Figure 9. Work Efficiency comparison**

## 6. Conclusion

Higher faculty engagement in educational institutions makes them a channel of growth for the student community. By deploying software bots to handle rules-based automotive tasks, the efficiency of the administration and faculty members to contribute for quality research and development is an outcome worth evaluation. This paper focuses on redefining the social sector with RPA, wherein the repetitive tasks which utilizes many precious man hours is productively handed over to the bots leaving room for the stakeholders to focus on cognitive work. More specifically it deals with how to establish an effective communication between the parents-students and faculty with the help of software bots.

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