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Enhancement of Moodle's Attendance Module - Defaulter's List Generation

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ABSTRACT: Moodle is a free software e-learning platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). Moodle's free source license and modular design allows any developer to create additional modules and features that has allowed Moodle to become a truly global, collaborative project in scope. This paper presents the unique module to generate Defaulter's list which is a primary activity in any college to identify defaulter students having less attendance as prescribed by governing body or university. This system is aimed at simplifying the complex task of computing the defaulter list of students and also provides the flexibility to configure initial parameters as per user's requirement.

KEYWORDS: Moodle, Engineering education, Attendance system, Defaulter's report.

I. INTRODUCTION

Learning management system (LMS) is a software application for administration, documentation, tracking, reporting and delivery of electronic educational technology courses or training programs.[9] LMS ranges from systems for managing training and educational records to software for distributing online or blended/hybrid college courses over the internet with features for online collaboration. Moodle is one of the well known Open source LMS system which is trusted by institutions and organizations large and small, including Shell, London School of Economics, State University of New York, Microsoft and the Open University, IIT Bombay, Don Bosco Institute of Technology Mumbai (DBIT). It delivers a powerful set of learner-centric tools and collaborative learning environments that empower both teaching and learning. It has a very simple interface, drag and drop features and well documented resources.[10]

Moreover, Moodle is provided freely as Open Source software, under the GNU General public license. Because it is open-source, Moodle can be customized in any way and tailored to individual needs.

Anyone can adapt, extend or modify Moodle for both commercial and non-commercial projects without any licensing fees and benefit from the cost-efficiencies, flexibility and other advantages of using Moodle. It is also scalable to any size, robust, secure and private.

In spite of such a vast development Moodle lacked various other tools. One of such tool is the defaulter report generating system with configurable defaulter factor. Every organization requires a tool that can easily generate defaulter's report generation. Moreover, the criteria for defaulters vary with every organization and may not always be same such as 60% or 75%. Also, students need to be exempted from few lectures during which they had participated in fest, placements or attended seminars etc. Incorporating such a flexible defaulter's report generating tool in Moodle is the need of many organizations.

II. LITERATURE SURVEY AND STUDY OF EXISTING SYSTEM

There are many existing systems such as Fedena, One Campus, Education ERP, TCS education ERP and Zillion. In our college we had used Zillion but it is not capable to generate the customized report such as defaulter's report, which is a very important report to identify students with low attendance and detain them. But purchasing a new ERP is a costly affair and also is not feasible. Moodle LMS is already being used for course management. Before the proposed system,

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faculty used to fetch the attendance record from Moodle and manipulate the data to generate defaulters using MS-Excel. This involves a lot of overhead and it does not provide the facility to generate different reports required for various administrative actions.

III. PROPOSED SYSTEM

‘Defaulter Report’ generation module is aimed at simplifying the complex task of computing the defaulter list of students at the same platform already being used for attendance management using “Moodle”.

The module must be capable of generating batch wise and class wise defaulter reports as per the requirements of the teacher. Since the defaulter report is generated at the end of every month, the module should also provide the option to generate month wise reports. The module must allow the teacher to set the defaulter factor (not necessarily 75%) to make it flexible for future changes and also allow the faculty to enter the number of lectures for which the student is exempted. This data should be directly reflected. Proposed system must provide the feature to amend the attendance where students can be exempted for attending various extracurricular, placement activities and technical seminars.

The ‘Defaulter Report’ must provide an interface which allows the faculty to enter the number of lectures for which the student is exempted. However Moodle attendance frame work provides the configurable field to mark the exempted attendance but in this case , faculty has to mark these special cases for individual session which is a tiring job because all the grievances are handled at the end of the semester. Newly developed system made the work easy by facilitating the feature to enter cumulative grievance count.

IV. REPORT GENERATION STEPS

This section describes the report generation steps for the users to get their work done easily. This report generation facility is available only for privileged teachers hence user has to login to access the report generation feature. As soon user get in to the system, he/she has to click the report section and select defaulter list option as shown in Fig. 1. Further user has to choose the appropriate course and division if applicable. Once the user gets in to required course , it has the facility to choose the students batches and can provide the filter criteria such as month and the percentage value as shown in Fig. 2, below which the student is considered as a defaulter. After passing all the required parameter, user has to click on apply filter option and report will be generated. Once the report gets generated, it can be exported as EXCEL document for future reference as shown in Fig. 3 and Fig. 4.

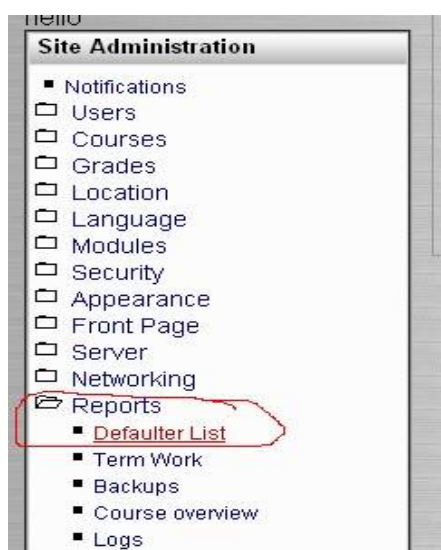


Fig. 1. Selection of Defaulter List module.

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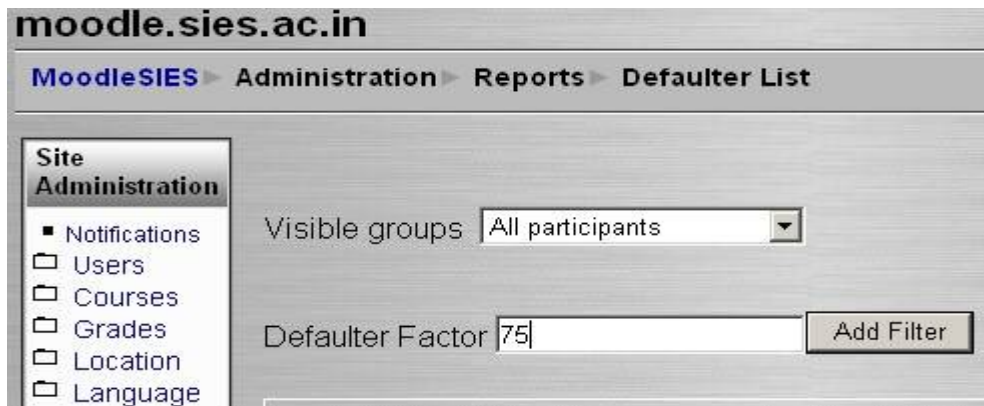


Fig.2 Filter criteria selection.

SIES Graduate School of Technology																												
DEPARTMENT : Computer Engineering																												
DEFAULTER REPORT FOR CE C																												
Roll No.	Theory										Practicals																	
	SPCC CE DIV C	SE CE DIV C	DD CE DIV C	MCC CE DIV C	ELOR CE DIV C	APS II CE DIV C	ELPM CE DIV C	MCC CE LAB DIV C	DD CE LAB DIV C	NPL CE LAB DIV C	SPCC CE LAB DIV C	SE CE LAB DIV C	ELOR CE LAB DIV C	ELPM CE LAB DIV C														
111a1032	14	63.64	16	64	14	48.28	15	75	9	100	4	57.14	0	0	4	100	5	62.5	9	100	6	100	3	60	5	83.33	0	0
111a1070	14	63.64	16	64	20	68.97	13	65	6	66.67	3	42.86	0	0	4	100	4	80	12	92.31	5	100	4	57.14	2	50	0	0
111a1085	13	59.09	14	56	19	65.52	12	60	0	0	5	71.43	5	50	4	80	3	60	4	50	5	83.33	4	80	0	0	4	80
112a1014	17	77.27	17	68	21	72.41	14	70	7	77.78	3	42.86	0	0	4	100	5	100	13	100	4	80	5	71.43	4	100	0	0
112a1027	14	63.64	15	60	16	55.17	10	50	0	0	4	57.14	4	40	3	60	1	20	2	25	6	100	2	40	0	0	3	60
112a1028	12	54.55	12	48	14	48.28	9	45	7	77.78	4	57.14	0	0	3	75	4	80	12	92.31	4	80	5	71.43	3	75	0	0
112a1067	15	68.18	19	76	21	72.41	14	70	7	77.78	2	28.57	0	0	3	75	4	80	13	100	4	80	5	71.43	4	100	0	0
112a1068	13	59.09	13	52	16	55.17	8	40	0	0	2	28.57	5	50	2	40	2	40	4	50	6	100	4	80	0	0	2	40
113a1001	15	68.18	19	76	21	72.41	15	75	0	0	6	85.71	8	80	4	80	3	60	8	100	6	100	5	100	0	0	4	80
113a1002	17	77.27	21	84	23	79.31	19	95	7	77.78	5	71.43	0	0	4	100	5	100	11	84.62	5	100	7	100	4	100	0	0
113a1003	17	77.27	19	76	23	79.31	17	85	7	77.78	6	85.71	0	0	4	100	4	80	11	84.62	5	100	6	85.71	4	100	0	0
113a1004	12	54.55	14	56	22	75.86	13	65	7	77.78	4	57.14	0	0	4	100	3	60	11	84.62	4	80	6	85.71	4	100	0	0
113a1005	14	63.64	16	64	20	68.97	13	65	6	66.67	3	42.86	0	0	4	100	4	80	12	92.31	5	100	4	57.14	2	50	0	0

Fig. 3 Top section of Defaulter's report.

113a1035	16	72.73	17	68	16	55.17	14	70	7	77.78	4	57.14	0	0	4	100	8	100	7	77.78	6	100	5	100	5	83.33	0	0
113a1036	18	81.82	20	80	22	75.86	17	85	0	0	7	100	9	90	4	80	3	60	8	100	5	83.33	5	100	0	0	4	80
113a1037	20	90.91	22	88	28	96.55	19	95	8	88.89	7	100	0	0	4	100	8	100	9	100	6	100	5	100	5	83.33	0	0
113a1038	17	77.27	19	76	19	65.52	15	75	0	0	6	85.71	9	90	5	100	5	100	6	75	5	83.33	4	80	0	0	5	100
113a1039	19	86.36	23	92	29	100	19	95	8	88.89	6	85.71	0	0	4	100	8	100	9	100	5	83.33	5	100	5	83.33	0	0
113a1040	19	86.36	24	96	24	82.76	20	100	0	0	7	100	8	80	5	100	5	100	7	87.5	6	100	5	100	0	0	5	100
113a1041	12	54.55	15	60	20	68.97	18	90	5	55.56	5	71.43	0	0	4	100	6	75	9	100	4	66.67	5	100	5	83.33	0	0
113a1042	16	72.73	18	72	25	86.21	18	90	7	77.78	7	100	0	0	4	100	6	75	8	88.89	4	66.67	3	60	6	100	0	0
113a1043	14	63.64	18	72	26	89.66	17	85	7	77.78	6	85.71	0	0	3	75	7	87.5	8	88.89	6	100	3	60	6	100	0	0
113a1044	18	81.82	23	92	26	89.66	18	90	0	0	5	71.43	7	70	5	100	5	100	6	75	6	100	5	100	0	0	4	80
113a1045	17	77.27	19	76	25	86.21	17	85	7	77.78	5	71.43	0	0	4	100	8	100	9	100	5	83.33	5	100	5	83.33	0	0
113a1046	11	50	16	64	20	68.97	12	60	6	66.67	5	71.43	0	0	4	100	6	75	6	66.67	5	83.33	4	80	3	50	0	0
113a1047	17	77.27	15	60	17	58.62	12	60	7	77.78	6	85.71	0	0	4	100	8	100	6	66.67	5	83.33	5	100	6	100	0	0
113a1048	15	68.18	14	56	18	62.07	16	80	5	55.56	4	57.14	0	0	3	75	8	100	6	66.67	4	66.67	5	100	5	83.33	0	0
113a1049	20	90.91	22	88	25	86.21	19	95	7	77.78	7	100	0	0	4	100	7	87.5	9	100	6	100	5	100	6	100	0	0
113a1050	15	68.18	21	84	24	82.76	17	85	0	0	5	71.43	8	80	4	80	5	100	5	62.5	6	100	5	100	0	0	5	100
113a1051	21	95.45	24	96	27	93.1	20	100	8	88.89	6	85.71	0	0	4	100	8	100	9	100	6	100	5	100	6	100	0	0
113a1052	17	77.27	20	80	27	93.1	20	100	8	88.89	6	85.71	0	0	4	100	7	87.5	9	100	6	100	4	80	6	100	0	0
113a1053	15	68.18	22	88	20	68.97	18	90	0	0	6	85.71	7	70	4	80	5	100	6	75	6	100	4	80	0	0	5	100
113a1054	20	90.91	24	96	28	96.55	18	90	8	88.89	6	85.71	0	0	4	100	8	100	9	100	6	100	5	100	6	100	0	0
113a1055	15	68.18	19	76	18	62.07	15	75	5	55.56	6	85.71	0	0	3	75	7	87.5	9	100	6	100	4	80	5	83.33	0	0
113a1056	18	81.82	21	84	25	86.21	20	100	6	66.67	7	100	0	0	4	100	8	100	8	88.89	6	100	5	100	6	100	0	0
113a1058	14	63.64	13	52	14	48.28	9	45	4	44.44	4	57.14	0	0	2	50	5	62.5	6	66.67	6	100	4	80	5	83.33	0	0

Fig. 4. Bottom section of Defaulter's report.



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The following section describes steps to exempt a student from a fixed number of lectures with the help of figures and by taking an example. For exempting students, privileged users have to login and go to defaulters report module under reports. Below the defaulter factor selection box, there is 'update exempted' field as we can see from Fig. 5. The working of exempt module is shown with the help of an example. As we can see in Fig. 6, roll number 113a1059 has attended 25 out of 50 lectures in the subject MP. So her attendance percentage is 50% (25/50 * 100). In order to exempt students, the privileged faculty selects 'update exempted' field and is taken to another page as shown in Fig. 7. Roll number 113a1059 has been exempted 3 lectures in MP as shown in Fig 7. The Defaulter report now shows 53.19% , as total number of lectures is reduced by 3 and the attendance percentage is then calculated as (25/47 * 100) as shown in Fig 8.

Visible groups: All participants | Monthwise Defaulter: All

Defaulter Factor: Add Filter

Update Exempted Export to Excel

SIES Graduate School of Technology																						
DEPARTMENT : Computer Engineering																						
DEFAULTER REPORT FOR CE D																						
Roll No.	Theory										Practicals							Tutorial				
	BCE CE DIV D		MP DIV D		OS DIV D		SOOAD DIV D		CN DIV D		OS LAB DIV D		CN LAB DIV D		MP LAB DIV D		SOOAD LAB DIV D		WTL LAB DIV D		BCE TUT CE DIV D	
	24	100	50	100	51	100	50	100	48	100	11	100	10	100	8	100	9	100	23	100	10	100
113a1059	11	45.83	25	50	21	41.18	20	40	21	43.75	5	55.56	7	70	7	63.64	6	85.71	18	78.26	7	77.78
113a1060	13	54.17	36	72	39	76.47	39	78	36	78.26	9	100	10	100	7	63.64	7	100	21	91.3	8	88.89
113a1061	20	83.33	41	82	38	74.51	37	74	35	76.09	8	88.89	9	90	10	90.91	7	100	18	78.26	8	88.89
113a1062	19	79.17	43	86	43	84.31	40	80	37	80.43	8	88.89	9	90	10	90.91	7	100	20	86.96	9	100
113a1063	20	83.33	43	86	43	84.31	41	82	39	84.78	9	100	9	90	10	90.91	7	100	22	95.65	9	100

Fig. 5. Update Exempted Field

SIES Graduate School of Technology																						
DEPARTMENT : Computer Engineering																						
DEFAULTER REPORT FOR CE D																						
Roll No.	Theory										Practicals							Tutorial				
	BCE CE DIV D		MP DIV D		OS DIV D		SOOAD DIV D		CN DIV D		OS LAB DIV D		CN LAB DIV D		MP LAB DIV D		SOOAD LAB DIV D		WTL LAB DIV D		BCE TUT CE DIV D	
	24	100	50	100	51	100	50	100	48	100	11	100	10	100	8	100	9	100	23	100	10	100
113a1059	11	45.83	25	50	21	41.18	20	40	21	43.75	5	55.56	7	70	7	63.64	6	85.71	18	78.26	7	77.78
113a1060	13	54.17	36	72	39	76.47	39	78	36	78.26	9	100	10	100	7	63.64	7	100	21	91.3	8	88.89
113a1061	20	83.33	41	82	38	74.51	37	74	35	76.09	8	88.89	9	90	10	90.91	7	100	18	78.26	8	88.89
113a1062	19	79.17	43	86	43	84.31	40	80	37	80.43	8	88.89	9	90	10	90.91	7	100	20	86.96	9	100
113a1063	20	83.33	43	86	43	84.31	41	82	39	84.78	9	100	9	90	10	90.91	7	100	22	95.65	9	100
113a1064	15	62.5	36	72	35	71.43	33	66	30	65.22	7	77.78	7	70	7	63.64	7	100	17	73.91	8	88.89
113a1065	15	62.5	33	66	39	84.78	37	74	32	69.57	5	55.56	8	80	10	90.91	5	71.43	20	86.96	8	88.89
113a1066	13	54.17	33	66	29	60.42	24	48	26	55.32	6	66.67	6	60	8	72.73	6	85.71	16	69.57	7	77.78
113a1067	18	75	40	80	41	80.39	40	80	38	82.61	8	88.89	8	80	11	100	7	100	21	91.3	9	100
113a1068	16	66.67	31	62	32	62.75	35	70	32	68.09	6	66.67	7	70	10	90.91	7	100	19	82.61	9	100
113a1069	14	58.33	35	70	36	76.6	35	70	34	73.91	6	66.67	7	70	8	72.73	4	57.14	22	95.65	8	88.89

Fig. 6. Defaulter Report before updating exempted.

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Report

Roll No.	Name	Theory					Practicals					Tutorial	
		BCE DIV D	CE DIV D	MP DIV D	OS DIV D	SOOAD DIV D	CN DIV D	MP LAB DIV D	OS LAB DIV D	SOOAD LAB DIV D	CN LAB DIV D	WTL LAB DIV D	BCE TUT CE DIV D
113a1059	VINITA NAIR	0	3	0	0	0	0	0	0	0	0	0	0
113a1060	VISHNU NAIR	0	0	0	0	0	0	0	0	0	0	0	0
113a1061	ADARSH NAMBIAR	0	0	0	0	0	0	0	0	0	0	0	0
113a1062	ROHIT NARASIMHAN	0	0	0	0	0	0	0	0	0	0	0	0
113a1063	ADITI NAYAK	0	0	0	0	0	0	0	0	0	0	0	0
113a1064	AISHWARYA NIKAM	0	0	0	0	0	0	0	0	0	0	0	0
113a1065	SWARAJ OTURKAR	0	0	0	0	0	0	0	0	0	0	0	0
113a1066	SIMRAN PAHUJA	0	0	0	0	0	0	0	0	0	0	0	0
113a1067	DRISHTI PANCHALE	0	0	0	0	0	0	0	0	0	0	0	0
113a1068	SNEHA PANICKER	0	0	0	0	0	0	0	0	0	0	0	0
113a1069	SHRUTI PARPATEDAR	0	0	0	0	0	0	0	0	0	0	0	0
113a1070	SHAILAJA PATHANIA	0	0	0	0	0	0	0	0	0	0	0	0
113a1071	SHARDUL SHARMA	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 7. Update Exempted module.

DEFAULTER REPORT FOR CE D																								
Roll No.	Theory										Practicals						Tutorial							
	BCE DIV D		CE DIV D		MP DIV D		OS DIV D		SOOAD DIV D		CN DIV D		OS LAB DIV D		CN LAB DIV D		MP LAB DIV D		SOOAD LAB DIV D		WTL LAB DIV D		BCE TUT CE DIV D	
	24	100	50	100	51	100	50	100	48	100	11	100	10	100	8	100	8	100	9	100	23	100	10	100
113a1059	11	45.83	25	53.19	21	41.18	20	40	21	43.75	5	55.56	7	70	7	63.64	6	85.71	18	78.26	7	77.78		
113a1060	13	54.17	36	72	39	76.47	39	78	36	78.26	9	100	10	100	7	63.64	7	100	21	91.3	8	88.89		
113a1061	20	83.33	41	82	38	74.51	37	74	35	76.09	8	88.89	9	90	10	90.91	7	100	18	78.26	8	88.89		
113a1062	19	79.17	43	86	43	84.31	40	80	37	80.43	8	88.89	9	90	10	90.91	7	100	20	86.96	9	100		
113a1063	20	83.33	43	86	43	84.31	41	82	39	84.78	9	100	9	90	10	90.91	7	100	22	95.65	9	100		
113a1064	15	62.5	36	72	35	71.43	33	66	30	65.22	7	77.78	7	70	7	63.64	7	100	17	73.91	8	88.89		
113a1065	15	62.5	33	66	39	84.78	37	74	32	69.57	5	55.56	8	80	10	90.91	5	71.43	20	86.96	8	88.89		
113a1066	13	54.17	33	66	29	60.42	24	48	26	55.32	6	66.67	6	60	8	72.73	6	85.71	16	69.57	7	77.78		
113a1067	18	75	40	80	41	80.39	40	80	38	82.61	8	88.89	8	80	11	100	7	100	21	91.3	9	100		
113a1068	16	66.67	31	62	32	62.75	35	70	32	68.09	6	66.67	7	70	10	90.91	7	100	19	82.61	9	100		
113a1069	14	58.33	35	70	36	76.6	35	70	34	73.91	6	66.67	7	70	8	72.73	4	57.14	22	95.65	8	88.89		
113a1070	19	79.17	31	62	32	62.75	34	68	29	60.42	9	100	10	100	11	100	6	85.71	21	91.3	9	100		
113a1071	17	70.83	42	84	36	70.59	34	68	33	71.74	8	88.89	8	80	8	72.73	6	85.71	17	73.91	8	88.89		
113a1072	22	91.67	45	90	48	94.12	45	90	43	93.48	8	88.89	9	90	11	100	7	100	22	95.65	9	100		
113a1073	12	50	31	62	30	58.82	31	62	28	58.33	8	88.89	9	90	11	100	6	85.71	22	95.65	9	100		
113a1074	21	87.5	42	84	40	78.43	40	80	37	80.43	9	100	10	100	10	90.91	5	71.43	21	91.3	9	100		

Fig. 8. Defaulter report after updating exempted.

V. EXPERIMENTAL RESULTS

A. Implementation:

Defaulter List is implemented by fetching the attendance of each student from mdl_attendance_log for each session of the course enrolled. The attendance log consists of attendance statuses that are fetched from mdl_attendancestatuses. The summation of attendance status 'Present' is calculated. Percentage is calculated by summation of lectures attended divided by the total number of sessions (after exemption).

Methodology used for testing:

Software testing is an investigation conducted to provide information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. [11] In order to ensure the correctness of the software, we prepared test scenarios for various test phases such as Alpha, Beta and Smoke Test as described below:



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➤ Alpha Testing

After the successful implementation of defaulter report system, alpha testing was performed to ensure its functionality. Alpha testing was performed by the development team on the development server of the Moodle. This testing ensured that the defaulter report was generated properly according to the value of defaulter factor entered by the tester. It also ensured that the month wise defaulter report was generated properly.

➤ Beta Testing

After Alpha Testing the Defaulter Report Module was successfully implemented on the actual server and it was made available for Beta testing. The Teachers and Partial Admin played an important role in Beta testing. The module was made available to them a week before 2nd February of 2014 (defaulter list generation scheduled date) for beta testing. The teachers made sure that the result of the defaulters report matched with their data calculated manually.

➤ Smoke Testing

Smoke testing was carried out by the team of developers to ensure that the functioning of defaulters report system didn't affect the functionality of any other module of the Moodle. Each and every existing module were tested against the regression of newly added module and no negative impact was found.

Proposed system is capable to identify defaulters easily as shown in the fig 4. Also the system can generate the report based on various configurable parameters such as batch, months and cut off percentage in efficient manner considering various grievances raised by the students as explained in section IV. This module was developed as the plug in for the Moodle version 1.9. User can easily integrate this module with their existing Moodle System. Many Engineering colleges under several universities have the mandatory attendance criteria and this module is helpful to identify the status of student's attendance.

VI. CONCLUSION AND FUTURE WORK

We have successfully fulfilled our aim of minimizing the paper work and saving the time. This system is giving the feature to update the attendance for special cases such as Medical, sports or any other event where student was absent but attendance must be modified to get the correct defaulter list. In future we are planning to incorporate notifications via SMS and E-Mail related to the defaulters to the students and the parents as well.

VII. ACKNOWLEDGEMENT

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REFERENCES

1. Groups API- MoodleDocs, http://docs.moodle.org/dev/Groups_API
2. Data Manipulation API- MoodleDocs, http://docs.moodle.org/dev/Data_manipulation_API
3. Core API - MoodleDocs, http://docs.moodle.org/dev/Core_APIs
4. Moodle Development kit -MoodleDocs, http://docs.moodle.org/dev/Moodle_Development_kit
5. Performance and scalability of Moodle-MoodleDocs, http://docs.moodle.org/dev/Performance_and_scalability#Limit_the_amount_of_RAM_each_page_requires_to_generate
6. Unit Test API-MoodleDocs, http://docs.moodle.org/dev/Unit_tests
7. Moodle@BU:lib/grouplib.phpFile References, http://docs.bumoodle.com/grouplib_8php.html
8. MoodleDictionary-MoodleDocs, <http://www.sourcexref.com/xref/moodle/nav.html?function/index.html>
http://docs.moodle.org/dev/Access_API
9. Learning management System, https://en.wikipedia.org/wiki/Learning_management_system
10. About Moodle - MoodleDocs, https://docs.moodle.org/30/en/About_Moodle



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11. Software Testing Wikipedia, https://en.wikipedia.org/wiki/Software_testing

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