INNOVATIVE APPROACHES APPLICABLE FOR CONDUCTING EXAMINATIONS IN LARGE SCALE DEPARTMENT

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Abstract

Major concern with conduction of examinations in large scale departments, institutes and universities is availability of resources such as centralized book keeping room, book shelves and human resources for books arrangement and human resources for books distribution. This resource requirements increase as department/institute scales up in terms of number of students, staffs, courses and programs. It would have direct impact on cost as well. It has been customary that the centralized approach of conducting examinations being used in most of the institutions. This traditional centralized approach requires above mentioned dedicated resources without which conduction of examinations is not feasible. This research paper highlights and discusses advantages, drawbacks of distributed and hybrid approaches of examination conduction system as well. This paper also compares resource needs of different approaches of examination conduction.

Index Terms: Centralized approach, Examination system, hybrid approach, large scale department.

I. INTRODUCTION

A typical examination conduction system involves activities as mentioned below.

- Arrangement of answer books and exam paper
- Room invigilation
- Answer booklet verification
- Booklets handover to supervisor and
- Booklets distribution to course owner.

This system is a multistep process which requires additional resources as mentioned below.

- Physical space for keeping answer booklets
- Human resources for room invigilation
- Human resources for books arrangements
- Human resources for books distribution.

This research paper captures various significant steps involved in centralized, distributed and hybrid approaches of examination conduction. As an objective of this research it determines resource consumption among all three approaches.

Experiments were conducted using all three approaches during mid-session examinations.

Some of the terms used in this paper and their definition are given below.

Room invigilator:

Human resource, typically teaching staff who performs invigilation in the exam hall.

Course Owner:

Teaching staff who is responsible for evaluation of answer booklets after the examination

Examination supervisor:

Teaching staff identified for monitoring and controlling the conduction of examination.

The objective of this paper is implemented in two stages. 1) Determining amount of physical resource, human resource and turnaround time consumed for each of the approaches. 2) Presentation and analysis of resource usage

among all the approaches. Resource usage is recorded after applying the steps identified for conduction of examination. Turnaround time of respective approach is recorded separately. Thereafter, recorded values of resource usage are taken to present the analysis.

This paper is organized as follows.

A. In section II, Details of approach used for conduction of examination using centralized approach is captured.

B. In section III, Details of steps used in completely distributed approach of examination conduction is captured.

C. In section IV, Hybrid approach of conduction of examination is discussed.

D. In section V, results of different approaches are presented. In section VI, conclusions about all the approaches are drawn.

II. CENTRALIZED APPROACH USED FOR CONDUCTION OF EXAMINATION

In centralized approach, the steps followed are mentioned below.

- o Reserving a central dedicated space
- o Arranging the books course/room wise
- o Arranging exam paper course/room wise
- o Room invigilator collecting designated booklets & exam paper from central room
- o Room invigilation
- o Verification of booklets after invigilation
- o Handover the booklets to central room
- o Rearrangement of booklets and booklets distribution to the course owner.

Please see (figure 1) for the sequence of steps in this approach. It is observed that this approach requires dedicated space, human beings for book arrangement/distribution. This resource requirement is throughout the period of examination conduction. Non-availability these resources will lead to failure of examination conduction process.

It is also observed that turnaround time consumed to conduct the exam is more because of the number of steps involved in this approach. Moreover, resource requirements increase if number of students, courses increases. This approach is suitable for departments with smaller sizes, i.e. 100-200 students, 5 courses per semester and 8-10 invigilators.

Calculation of turnaround time is done using following equation for the centralized approach. Turnaround time is defined as time taken to complete all the steps used for completing the conduction of examination by an invigilator for a given course and a given set of students.

i.e $Turnaroundtime(C) = T(a) + T(b) + T(c) + T(d) + T(e) + T(f)$

Where,

Turnaroundtime (C) = Turnaround time for Centralized approach,

T (a) = Time taken to collect Answer booklets & exam paper by invigilator from central room,

T (b) = Time taken perform room invigilation,

T(c) = Time taken to handover the booklets to central room, T (d) = Time taken to verify the booklets,

T(e) = Time taken to arrange booklets course wise in book shelves kept in centralized dedicated room,

T (f) = Time taken by course owner to collect answer booklets from centralized dedicated room for evaluation.

Centralized approach is reliable as long as backup resources are provided for dedicated resources. These backup resources are needed to address non-availability of dedicated resources. However, this will add to the existing cost.
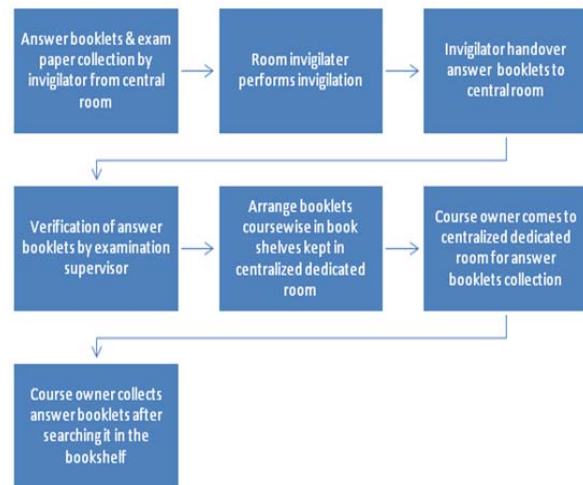

Figure 1. Steps followed in centralized approach of examination conduction

III. DISTRIBUTED APPROACH USED FOR CONDUCTION OF EXAMINATION

In distributed approach, the steps involved are mentioned below.
- o Room invigilator collecting designated booklets & exam paper from course owner
- o Room invigilation
- o Verification of booklets after invigilation
- o Handover the booklets to course owner.

Please see (figure 2) for the sequence of steps in this approach. This approach does not require dedicated space, human beings for book arrangement and distribution throughout the period of examination conduction. Books arrangement is done by course owner himself. After the invigilation, answer booklets are submitted to course owner directly instead of central room.

It is observed that turnaround time to conduct the exam is less because of the lesser number of steps involved in this approach when compared to centralized approach. Though additional resources are not required in this approach, it would not be suitable for large sized departments where course owners are distantly distributed physically in the large campus. Non-availability of any of the course owner or invigilator will lead to failure of conduction of examination. This approach is suitable for medium sized departments, i.e 400-500 students and 18-20 invigilators.

Calculation of turnaround time is done using following equation for the distributed approach. Turnaround time is defined as time taken to complete all the steps used for completing the conduction of examination by an invigilator for a given course and a given set of students.
i.e Turnaroundtime (D) = T(a) + T(b) + T(c) + T(d)
Where, Turnaroundtime (D) = Turnaround time for distributed approach,
T (a) = Time taken to collect answer booklets and exam paper by invigilator from course owner,
T (b) = Time taken perform room invigilation,
 T(c) = Time taken to handover the booklets to course owner,
 T (d) = Time taken to verify the booklets.

Distributed approach is not reliable as there are no backup resources. Hence the cost is less.
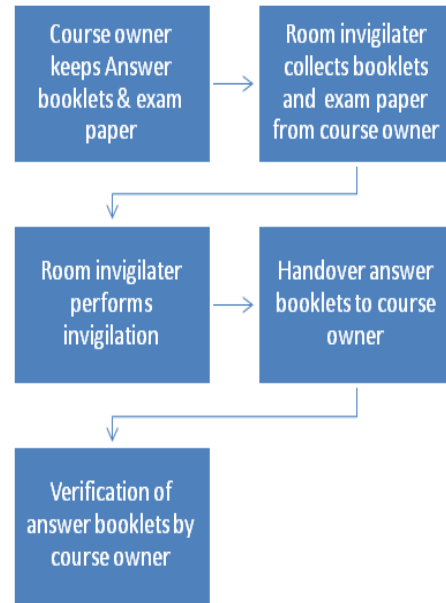

Figure 2. Steps followed in distributed approach of examination conduction

IV. HYBRID APPROACH USED FOR CONDUCTION OF EXAMINATION

Hybrid approach combines initial step of centralized approach with final steps of distributed approach. In this approach, the steps followed are mentioned below.
- o Reserving a central dedicated space
- o Arranging the books course/room wise
- o Arranging exam paper course/room wise
- o Room invigilator collecting designated booklets and exam paper from central room
- o Room invigilation
- o Verification of booklets after invigilation
- o Handover the booklets to the course owner.

Please see (figure 3) for the sequence of steps in this approach. It is observed that this approach requires dedicated space, human beings for book arrangement only during time books issue, but not throughout the period of examination conduction.

It is also observed that turnaround time to conduct the exam is less because of the lesser number of steps involved in this approach. Moreover, human resource requirements are less compared centralized approach. This approach is

suitable for departments with larger sizes, i.e 800-1000 students and 30-50 invigilators.

Calculation of turnaround time is done using following equation for the hybrid approach. Turnaround time is defined as time taken to complete all the steps used for completing the conduction of examination by an invigilator for a given course and a given set of students.

i.e Turnaroundtime(H) = T(a) + T(b) + T(c) + T(d)

Where, Turnaroundtime (H) = Turnaround time for hybrid approach,

T (a) = Time taken to collect Answer booklets and exam paper by invigilator from central room,

T (b) = Time taken perform room invigilation,

T(c) = Time taken to handover the booklets to course owner,

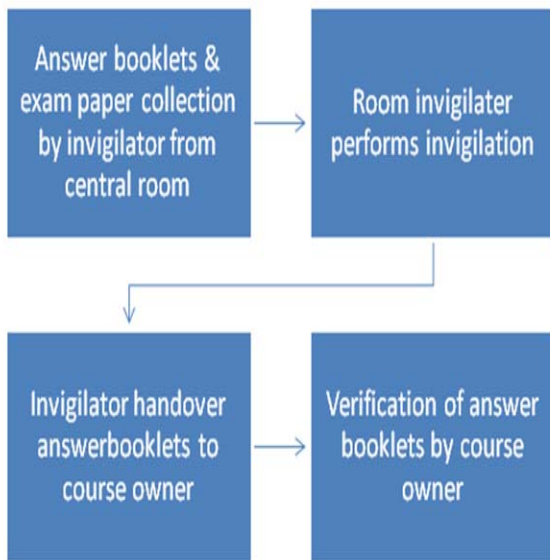T (d) = Time taken to verify the booklets by course owner.

Figure 3. Steps followed in hybrid approach of examination conduction.

V. RESULTS OF EXPERIMENTS

Observed and recorded turnaround time for all the three approaches is shown via graph.(Figure 4).These experiments were conducted in a department with varying workload unit(student strength) as shown in the graph. Comparison of the features of all the three approaches are also made.(Figure 5).
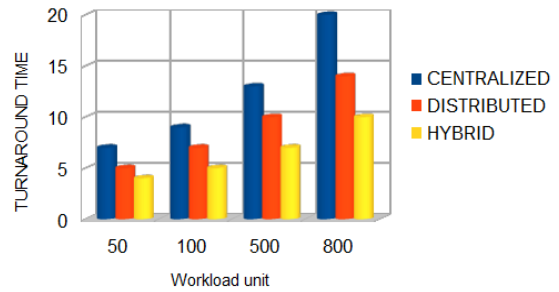

Figure 4. Turnaround time (scaled to minutes) determined across different approaches of examination conduction

Features	Hybrid approach	Centralized approach	Distributed approach
Dedicated physical resources	YES	YES	NO
Turnaround time	MEDIUM	HIGH	MEDIUM
Reliability	HIGH	HIGH	MEDIUM
Cost	MEDIUM	HIGH	LESS

Figure 5. Comparison of features of all the approaches of examination conduction.

VI. CONCLUSIONS

This research work resulted in following conclusions.

o Provides experimental findings on various examination conduction approaches.
o Turnaround time consumption is determined across centralised, distributed and hybrid approaches of examination conduction.
o Comparison in terms of turnaround time, dedicated physical resource requirement, reliability and the cost is drawn.
o Helps to decide upon a possible approach that can be used for a given circumstance.

REFERENCES

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