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**NAIT CPD : A Systems Approach
for Program Review Projects**

par

Mave DHARIWAL
Northern Alberta Institute of Technology (NAIT)
(Alberta)

Atelier 1B7

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A continuous and difficult question facing managers today is why some employees perform better than others. A number of interesting and important variables can be used to explain performance differences among employees. For example, such variables as ability, instinct, intrinsic and extrinsic rewards, aspiration levels, and personal backgrounds may explain why some employees perform better than others.

Management must consider motivating diverse and sometimes unpredictable groups of people. The diversity results in different behavior patterns that are in some manner related to needs and goals. Needs refer to deficiencies that an individual experiences at a particular point in time. The deficiency may be physical, self-esteem related, sociological etc. Needs are viewed as triggers of behavior. The implication is that when "need deficiencies" are present, the individual is more susceptible to the motivational efforts of managers.

Each person is attracted to some set of goals. If a manager is to predict behavior with any accuracy, he / she must know something about an employee's goals, and the actions the person will take to obtain them. There is no shortage of motivation theories and research findings that attempt to provide explanations of the behavior-outcome relationships. A manager's ability to gain peer and subordinate confidence is an important factor for success.

William V. Haney, author of *Communication and Interpersonal Relations* states that when we consider the nature of an organization and the trends toward larger size, complexity, demand for greater efficiency, and so on, it becomes eminently clear that today's organization requires communication performance at an unprecedented level of excellence.

"I know I'm supposed to 'know my people,' but business is just too good. Pressure for output is tremendous, the labor market is drum-tight, and turnover is high. I simply don't have time to know my people." The complaint is pervasive in many of our fast-growing sectors.... Moreover, employees' expectations of their employers are high and growing higher.... In consequence of these changes, a new, more subtle postindustrial revolution is in process, and this revolution is leading to a serious reexamination of the role of the manager and of the organization.¹

Haney further expresses the emerging relationship as follows:

The leadership and overall atmosphere (climate) of an organization must be consistent with the needs of its individual members. The organization must provide a supportive culture. The essential element is trust. Management must trust that subordinates will (or can) be capable of and indeed will contribute to the attainment of organizational objectives. Conversely, employees must trust that the organization, mostly in the form of their respective managers, will reward individuals fairly and provide for the gratification of their relevant needs as they help the organization achieve its goals.²

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In the systems approach to management, the manager's job involves establishing goals for the system, responding to external relationships, and designing and managing the internal and external relationships so that the chosen goals are met. Systems are designed to accomplish specific results. Managers accomplish their responsibilities by network building and agenda setting. They rely on personal relationships, along with managerial skills in planning, organizing, staffing, directing and controlling. The style of management is affected by the manager's personal characteristics, communication and interpersonal skills, past experiences, and technical ability. According to motivational theories, trust and performance are considered to be major factors in successful, constructive management. High trust tends to stimulate high performance; conversely, low trust would stimulate low performance. William V. Hancy, author of *Communication and Interpersonal Relations* states:

"The key, then, is *trust*. By and large, high trust tends to stimulate high performance - so say the overwhelming majority of over 9,000 supervisors I have questioned in 58 organizations of varying kinds and sizes. These supervisors feel that subordinates generally respond well to their superiors' genuine confidence in them. They try to justify their bosses' good estimate of them."³

People want to participate and become involved in decisions affecting their work. The cold realities of profit orientation have forced organizations to become more concerned with non-participation than with participation. A reorientation in such thinking is needed to correct the aberrations of non-participation. There are enormous benefits to be gained from constructive participation. Gibson et al., authors of *Organizations*, state:

If only managers could be made aware of the positive results associated with participation such as improved morale, increased job satisfaction, and increased performance. As society becomes more educated, there must be a shift in organizations toward more participative management. The educated man or woman wants more say in how he or she will do a job. This is what educated people demand and seek - autonomy, self actualization, and the right to make decisions.⁴

Theory X assumes the average person to be inherently lazy, immature, irresponsible, gullible, resistant to change, self-centered, and indifferent to organizational needs. Management practices, dealing with people according to theory X, have suggested the application of external controls.

While conceding that people are quite capable of immature behavior, McGregor argues that such behavior and attitudes are not manifestations of their inborn nature but the product of their experiences... Thus, in reacting to a myth (people are unchangeably immature) with external controls, managers have stimulated subordinates' behavior, and thus in turn perpetuated the myth and seemingly justified their practice, for the more one controls, the more one has to control and, as goes the old Chinese saying, "He (or she) who rides the tiger can never dismount."⁵

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Maslow's theory is built around the premise that people have a need to grow and develop. According to Maslow's theory, human needs are arranged in a hierarchy,⁶ commencing with the lowest level physiological needs, to Safety and Security, Belongingness, Self-Esteem, and at the highest level, the Self-Actualization needs. Maslow's theory assumes that a person attempts to satisfy basic needs before directing behavior towards satisfying upper level needs. A crucial point in Maslow's theory is that a satisfied need ceases to motivate.

Theory Y assumes that humans are potentially mature. The goal of management under Theory Y is to arrange organizational conditions and methods of operations so that people can achieve their own goals best by directing their own efforts towards organizational objectives.⁷

Some traditional managers believed that freedom of the individual to satisfy his or her needs would interfere with the organization's objectives. In other words, freedom could only be attained at the expense of order.

"How can I be a Theory Y manager when I report to a Theory X boss?" or, "How can I delegate authority when my boss doesn't delegate it to me?" These are the plaintive cries of many managers participating in Theory Y management seminars.⁸

It can therefore be said that corporations making use of Theory X over Theory Y are less likely to attain their organizational goals.

The methodology used in the Northern Alberta Institute of Technology (NAIT) - Engineering Technologies Division to affect major programming changes reflects many components of Theory Y, through a systems approach.

The systems approach combines organizational communication, project management, management-by-objectives, modified DACUM¹¹ process, and total quality management techniques, to ensure successful completion of "program review" projects. The systems approach is known as the "NAIT CPD" process at the Northern Alberta Institute of Technology.

There are many reasons why a program may undergo review or validation. These include negative feedback from employers, dissatisfaction on the part of staff and students, low enrollments, low graduate job placement, rapid new technological advancements in related industries, negative feedback through the program advisory committee, etc. Some of the benefits of a program review are:

- 1) increased effectiveness of programs according to current industrial needs;
- 2) reduced overlap between courses in each program;
- 3) identification of similarities between clustered programs, and possible new clusters of programs;
- 4) lower number of courses per semester to reduce student and instructor workload without compromising the teaching/learning objectives;
- 5) upgrading of the academic content of the program, if required;
- 6) identification of resource and staff upgrading requirements to deliver the revised program; and

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- 7) a structured implementation action plan which ensures successful completion of the changes and their verification, through an effective feedback system.

Many traditional program validation procedures use the questionnaire technique to validate and update program curricula. Usually, a program development consultant is assigned to the program to assist in the preparation and mail-out of a questionnaire, gather and analyze data, and provide recommendations for possible curriculum changes to reflect current industrial needs.

I believe that the final recommendations of such research may be difficult to implement:

1. The consultant may be seen as an outsider.
2. The instructional staff may consider the review prescriptive, because of lack of staff input during planning and data analysis stages.
3. The feedback received through the questionnaire may be questionable: Did the respondent understand the question? Was he/she in a hurry to complete it? Did the respondent have adequate technical background to answer all the questions? Did the respondent have some hidden agenda, etc.?
4. Once the recommendations are formulated, the report is usually submitted to the Dean's office. It is not clear that the administration always understands the recommendations or that those officers even perceive the requirement for change.
5. The recommended changes seldom include cost implications.
6. Even when administration and staff understand the recommendations, it is not clear that they are committed to implementation since they had not been involved in the program review activities.
7. Rarely do recommendations include specific feedback mechanisms.
8. It becomes very convenient to disregard any major recommendations. A lack of structured follow-up makes it easy to disregard major recommendations.
9. Not all the stakeholders are invited to participate in the review process. These stakeholders might include the President, Vice President-Academic Affairs, Dean and Associate Deans, Program Head, Instructional Staff, the program Advisory Committee, the Students, and Alumni etc.

The NAIT CPD process was developed for the Ecuadorian projects in 1985, to ensure appropriate input by all the stakeholders through the life of each "program review" project. To date, the process has been successfully used to train 99 NAIT staff, representing the Business, the Engineering Technologies and the Industrial division. This training was provided through PDS,¹⁶ which is an academic research arm of NAIT. The staff from PDS have assisted in fine tuning the process over the years.

The NAIT CPD process has been used to review nine programs in the Engineering Technologies Division to date. The process assured positive program development and scheduled implementation within the Institute's budgetary constraints. In addition to the process itself, there are many factors which affect the outcome of each project, but which are not apparent in the sequential description of the process. These hidden factors relate to organizational communication and interpersonal relations, and must be adequately addressed for successful completion of each project.

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It must be stated at the outset that the project coordinator must be invisible throughout the life of each project, particularly with respect to the developments. Developments derive from input received both from instructional staff and from industrial representatives, experts in their respective fields. The coordinator, who is experienced in dealing with people at various levels within and outside the organization, must possess good interpersonal communication skills and a developed sense of responsibility and accountability. He/she remains, however, a facilitator. The role of the coordinator is extremely important to the success of these projects. The coordinator provides continuity among all the stakeholders for the life of the project and assures appropriate recognition for their contributions to the development of the project.

Once a program has been selected for evaluation, the coordinator liaises with the Program Head to identify major tasks for the project and the duration of each. This information is analyzed using Program Evaluation and Review Technique or Critical Path Method (PERT/CPM) computerized planning software to calculate earliest/latest start and completion dates, and total "slack" in each task, and thus identify the network's critical path.

Each task on the critical path must be completed by the assigned date, in order for the project to remain on schedule. The critical path network is used to prepare a Proposed Program Review Action Plan (PPRAP), which specifies each task, its description, the person(s) assigned to it, and its scheduled date of completion.

In order to provide adequate opportunities to instructional staff for before-the-fact input, the coordinator meets with the Dean, the Associate Deans, the Program Head, and instructional staff to review the proposed program review action plan. During this meeting, the coordinator provides an overview of the program review procedure to the participants and requests constructive input. Upon completion of this session, the PPRAP is revised, if necessary, and submitted to the Dean's office for approval. These events ensure appropriate instructional staff input and commitment to the project. According to Maslow's hierarchy of needs theory, the before-the-fact consultation attends to staff's ego and self-fulfillment level needs. Such consultation corroborates the importance of staff input to the success of the project from beginning to end.

Only the management that has confidence in human capacities and is itself directed toward organizational objectives rather than toward the preservation of personal power can grasp the implications of this emerging theory. Such management will find and apply successfully other innovative ideas as we move slowly toward the full implementation of a theory like Y.⁹

One of the significant strengths of the process lies in its ability to receive input in a group setting, where the participants are assured equal opportunity to comment on, and debate each topic, without criticism or fear of retribution, all under the guidance of the coordinator.

The next step in the process is to establish a list of "competencies" for the graduate of the program. These competencies constitute those entry level skills

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considered important by staff, based on their respective experience, and in accordance with the following criteria: 1) what the graduate of the program should be able to do upon completion of training at NAIT; and 2) what training will best serve industry locally, regionally, and nationally.

If the program has an existing list of competencies, these competencies are reviewed by the instructional staff and modified as necessary. Should there be no such list, or should the instructional staff feel the competencies are out of date, the instructional staff establishes competencies based on collective experience. This exercise records staff perceptions regarding graduate competencies for the program. It deals with staff members' frames of reference and self-images. If the staff were not allowed to identify competencies based on their own experience, they might feel threatened by the changes which might be recommended by industry. By allowing the "group" to identify competencies, the potential for individual criticism is lessened, in case of industry disagreeing with instructional staff identified competencies.

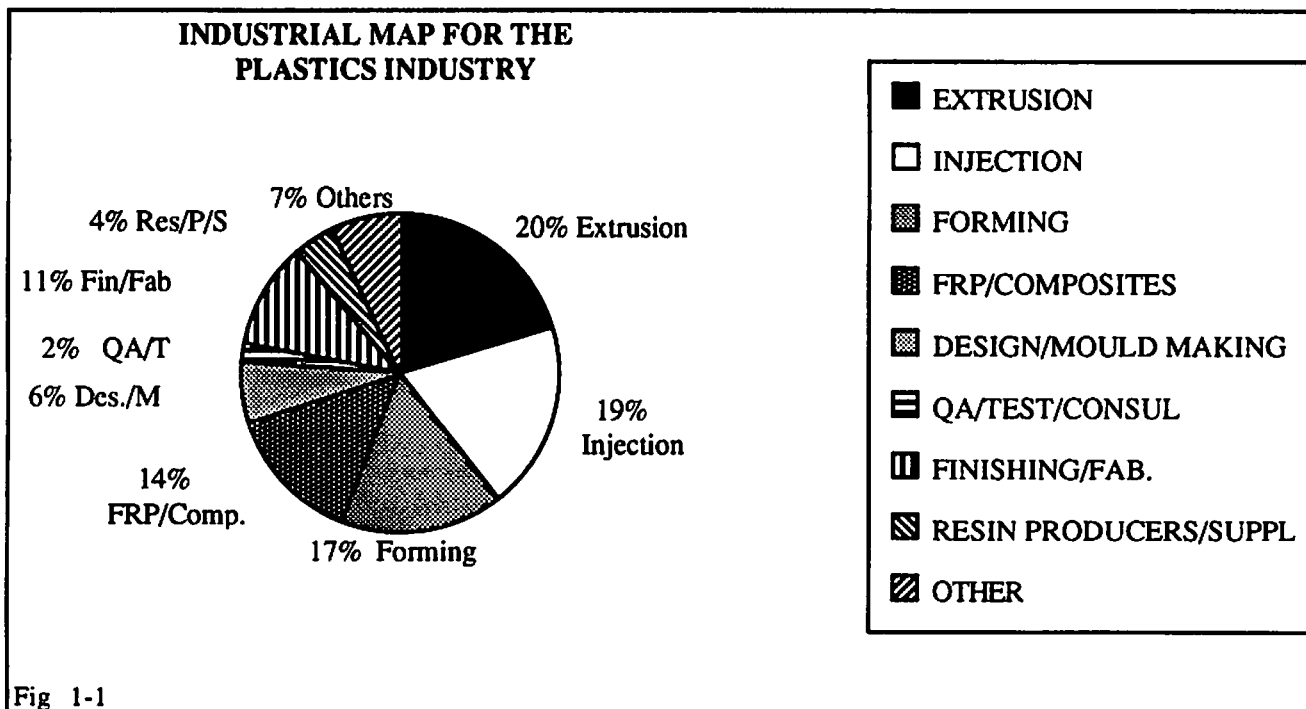
Organizations have frequent examples of people passing up promotions, balking at enlarged responsibilities, and in general resisting positive feedback-because those cues, albeit favorable, constitute too great a parity from those people's current self-images. In sum, one's self-image is threatened by big, sudden, uncontrolled change - whether the change is negative or positive. The basic threat comes from: "You are not who you think you are - you do not have contact with reality!" But how big, how sudden, and how uncontrolled must the change be in order to constitute a threat? The answer depends upon one's comfort zone.¹⁰

The instructional staff who teach in the program under review are invited to a day long meeting. During this session, under the guidance of the project coordinator, the instructional staff identify "general areas" of training within the program, i.e. Design, Sales & Service, Communications, etc. Entry level competencies are identified under each area. Upon completion of this exercise, the staff identify from 100-120 competencies for the graduate of the program.

The proposed competencies identified by instructional staff are prepared in the form of a questionnaire for a subsequent meeting with industrial practitioners.

In order to select industrial practitioners for program review, an industrial map of the related industry is created. This is done by gathering information from NAIT's placement centre, program instructional staff, NAIT alumni, and any other relevant sources. Invitations are then issued to employers/potential employers selected from each sector on a proportional basis by industry representation (see fig.1-1).

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The guests are practitioners and/or their supervisors, all possessing considerable field experience. All members of the regular advisory committee are invited to the program review workshop. The guests and the members of the regular program advisory committee are jointly referred to as the Competency Profile Development Committee (CPDC), which is comprised of twenty to twenty-five people.

The Project Coordinator acts as facilitator for the CPDC; the Program Head is present as a resource person. The CPDC reviews each competency to decide if it should be retained, modified, or deleted from the list, and adds new competencies to the list, if required (It also votes on "major areas of training" according to their relative importance within the program). The CPDC openly discusses the importance of each competency, voting on it according to the following criteria.

VOTING CRITERIA

- (3) Extremely Important
- (2) Important
- (1) Somewhat Important
- (0) Unimportant / Irrelevant

Typical competency card

**PROVIDE
TECHNICAL
SUPPORT**

(2.6)

Ranking →

Major areas of training are posted on the board. Each competency is ranked and

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posted against its heading. The ranked number is a result of votes by the CPDC members. The CPDC members vote using values of 3, 2, 1, or 0, thus producing an average which likewise falls between 0 and 3. Each member of the CPDC also records his/her vote on their respective questionnaire for further statistical analysis, if required.

For example:

If there were 20 CPDC members and they were voting on one competency, and their votes were:

12 votes at 3, 7 votes at 2, 2 votes at 1, and 1 vote at 0;

$$(12*3+7*2+2*1+1*0)/20 = 2.6$$

Then, the weighted average vote (rank) for the competency would be (2.6)

MAJOR AREAS OF TRAINING	RANKED COMPETENCIES		
SALES & SERVICE (1.7)	PROVIDE TECHNICAL SUPPORT (2.6)	(2.1)	(1.5)
GENERAL (1.8)	(2.9)	(2.5)	(1.2)
DESIGN (2.8)	(3)	(2.9)	(2.5)
COMMUNICATIONS (2.5)	(2.7)	(2.4)	(1.3)

COMPETENCY CHART

Upon completion of this exercise, the major areas of training and their related competencies are converted into a typed list.

A good competency chart is a valid, reliable and sound base from which to develop a curriculum. A well built competency chart is an exhaustive list of the skills of the occupation as seen and defined by the best practitioners of that occupation. The chart states explicitly for the curriculum designer what a graduate of a program should be able to do, and at what performance level. The chart does not specify how the learner should get to the target: it defines the target only. The target is defined on the level of general areas of competence, as well as on the skill level.¹²

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The industrial practitioners are genuinely interested in assisting NAIT in revising its programs according to current industrial needs. It is interesting to note that the industrial practitioners, who are considered experts in their fields, are volunteers who agree to spend at least one and a half days assisting NAIT in a dynamic workshop, debating, modifying, and validating competencies for the program. By requesting the assistance of industry, we address their self-fulfillment, self-esteem, esteem-by-others, and their self-actualization needs, as defined by Maslow's hierarchy of needs. Furthermore, the industrial representatives view this exercise as an opportunity to provide direction for future technological training, from which they as potential employers would benefit. The public at large would benefit, since appropriate training would enhance industry's ability to raise productivity and ultimately our standard of living.

Throughout this process, the stakeholders receive appropriate feedback upon completion of each activity. This feedback summarizes work to date and provides information for the next step. All participants are encouraged to review the feedback and provide further input as necessary.

Once the CPDC has concluded its work, the ranked competencies are compared with the existing program, in order to identify courses which should be revised or eliminated from the program, and to identify new courses for competencies which are outside of the current program.

The instructional staff fit the ranked competencies into the existing program to identify its shortcomings or areas of overlap which may have developed over time. At no point in this exercise should anyone question why such deficiencies or overlap exist. The intent is not to find "scapegoats," but to establish how the program could best be updated by the group.

Upon completion of the deficiency/overlap exercise, the instructional staff combine, delete, identify courses to reflect current industrial needs. The revised program outline is presented to the CPDC for their information, and their recommendations for the "ranked competencies" are requested.

Using the recommended list of competencies for the program, manpower, equipment, laboratory and space requirements are evaluated for the revised program implementation scheduled for the following academic year. The resource requirements are identified complete with an estimated value and priority.

Manpower needs are evaluated to determine if additional staff are required, or if existing staff require upgrading in order to deliver new/revised courses. The upgrading requirements are established with staff's assistance. Staff members identify their areas of interest and their (respective) upgrading requirements.

The general condition of laboratory equipment is evaluated to determine if it would be adequate to support the proposed changes. Equipment upgrading requirements are identified and submitted to the Dean's office for approval. The

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existing laboratory facilities or space requirements for the program are reviewed in view of the proposed curriculum changes.

The list of recommended competencies from the regular Advisory Committee Chairman and the resource implications from the Program Head/ Project Coordinator are submitted to the Dean's office for approval. The (approved) package is then submitted to the President's office for approval. The recommendations summarize the results of dynamic group work, involving instructional staff and industry.

The recommended list of competencies and the resource implications are received by the President's office. Based on the input received from the Dean's office, and from the Vice President, Academic Affairs, the President grants his approval of the proposed changes.

The program staff now have official authorization to proceed with curriculum changes to reflect current industrial needs. At this point, it can be seen that all stakeholders have been party to the developments (to date) and have approved the development work at various stages. The success of the process is largely due to stakeholder involvement and constructive criticism throughout the life of the project.

The instructional staff use the recommended competencies to identify general instructional objectives for each course, so as to reflect current industrial needs as identified by the ranked competencies. This is an important step in the process which provides (appropriate) linkages from the competencies to the learning objectives for each course. While the general objectives for each course are identified, other members of instructional staff who do not teach those courses, but teach in the program, are also invited to participate. These activities provide valuable opportunities for staff to become familiar with other courses within the program, thus reducing the likelihood of overlap.

An "Implementation Action Plan" is prepared, in consultation with program staff, subsequently approved by the Dean's office, thus allowing the program to continue with scheduled activities during the implementation stage of the project.

Upon completion of the study, the implementation of the revised first year takes place in the next academic year, along with an interim year-two for the students who were registered in the first year while the program review was being carried out. The implementation of the revised second year takes place during the following academic year.

Typically, implementation is completed in two academic years following the completion of program review. The implementation action plan identifies scheduled activities and appropriate feedback processes from students, instructional staff, the Program Head, and the Deans' office. This feedback is reviewed at the end of each semester, particularly during the implementation period.

During the implementation period, student feedback is received via the "Feedback-on-Instruction Questionnaire," and through a dynamic group-feedback session between the Program Head and the students at the end of each semester. The

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Program Head is encouraged to share the feedback with instructional staff and to establish an action plan in response to that feedback. A summary of the proposed action plan is then shared with the students.

The project coordinator prepares the final report which reflects developments to date, recommendations for the program, and the implementation action plan.

The NAIT CPD process encourages members of the advisory committee, the invited employers, and the instructional staff to provide unreserved input to assist in revision of the program according to current industrial training needs, while maximizing use of NAIT resources. The strength of the process lies in the interaction and accountability among stakeholders. Every stakeholder is exposed to the process over the life of the project. Furthermore, each is party to the developments and therefore enjoys ongoing participation, ownership, and commitment to successful completion.

By being initiated/conducted from the Dean's office, the process demonstrates that the Division's management team is seriously committed to the review and implementation. Because of its resident expertise base, it is a very effective and efficient activity, particularly when dealing with major program review.

The revised curriculum is not allowed to become static, and is updated continually through the regular advisory committee process. The curriculum is evaluated once every five or six years through this process, especially when accreditation by an outside agency is anticipated in the near future.

The NAIT CPD process assures continued quality in programming, and offers a vehicle by which both the membership of the advisory committee and the institute's programs can be updated in light of changing industrial needs.

For the students, the process assures curriculum currency, less overlap amongst courses, better flow of courses through the two years, and lower workloads.

For the instructional staff, it provides verification of their personal expertise, identifies upgrading requirements based on current industrial needs, reduces workload without compromising content, provides an opportunity to upgrade their laboratories and instructional materials, and provides an excellent opportunity for team building and improved morale.

For industry, it provides an opportunity to participate in the training process, and an assurance of receiving appropriately trained graduates to meet local, regional and national industrial needs.

For NAIT administration, the process increases the effectiveness of programs in meeting current industrial needs, reduces overlap amongst courses in each program, identifies similarities between clustered programs and possible new clusters of programs, reduces the number of courses per semester to reduce student and instructor workload without compromising the teaching/learning objectives, upgrades or verifies the academic content of the program, identifies resource and staff

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upgrading requirements to deliver the revised program, and provides a structured implementation action plan which ensures successful completion and verification of the changes through an effective feedback system.

Other major strengths of the process are that it is competency based - ranked at job entry level, all stakeholder input is solicited without territoriality, including alumni (practitioners) and current students, Dean's office commitment - expertise/experience of managers, ongoing involvement, knowledge, understanding, debate and resolution by instructional staff from beginning to end. The project is managed using critical path scheduling, and quality management principles, which provides accountability in the line.

The NAIT CPD process has been applied successfully three times in Ecuador^{13/14/15}; Ecuadorian educators trained in the process are currently performing consultancy work at other technical institutes in Ecuador - testimony to the success of the systems approach. The process has been successfully applied nine times¹⁷ in the engineering technologies division of NAIT. The process extensively makes use of Theory Y management principles, coupled with tried and tested project management (PM), management by objectives (MBO), and total quality management (TQM) techniques to encourage team work, build morale and maintain scheduled timelines.

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INFORMATION

***"Validating and Updating Curriculum
using the Competency Profile Development (CPD) Process"***

A Handbook for
Academic Staff, Program Developers, and College Administrators
will be available this fall (1992) from
the Northern Alberta Institute of Technology.

**For further information,
please contact:**

**Bill Spaans, Director, Program Development Services
Tele: (403) 471-7008 Fax: (403) 471-8811/8583**

or

**Clive McNichol, Manager, Continuing Education
Tele: (403) 471-8551 Fax: (403) 471-8583**

**For specific information
about this paper, please contact:**

**Mave Dhariwal, Quality Coordinator, President's Office
Tele: (403) 471-7006 Fax: (403) 471-8811/8583**

or

**Lee Bradshaw, Dean, Engineering Technologies Division
Tele: (403) 471-7714 Fax: (403) 471- 8583**

**PROGRAM VALIDATION PROCESS USING
COMPETENCY PROFILE DEVELOPMENT (C.P.D.) METHOD**

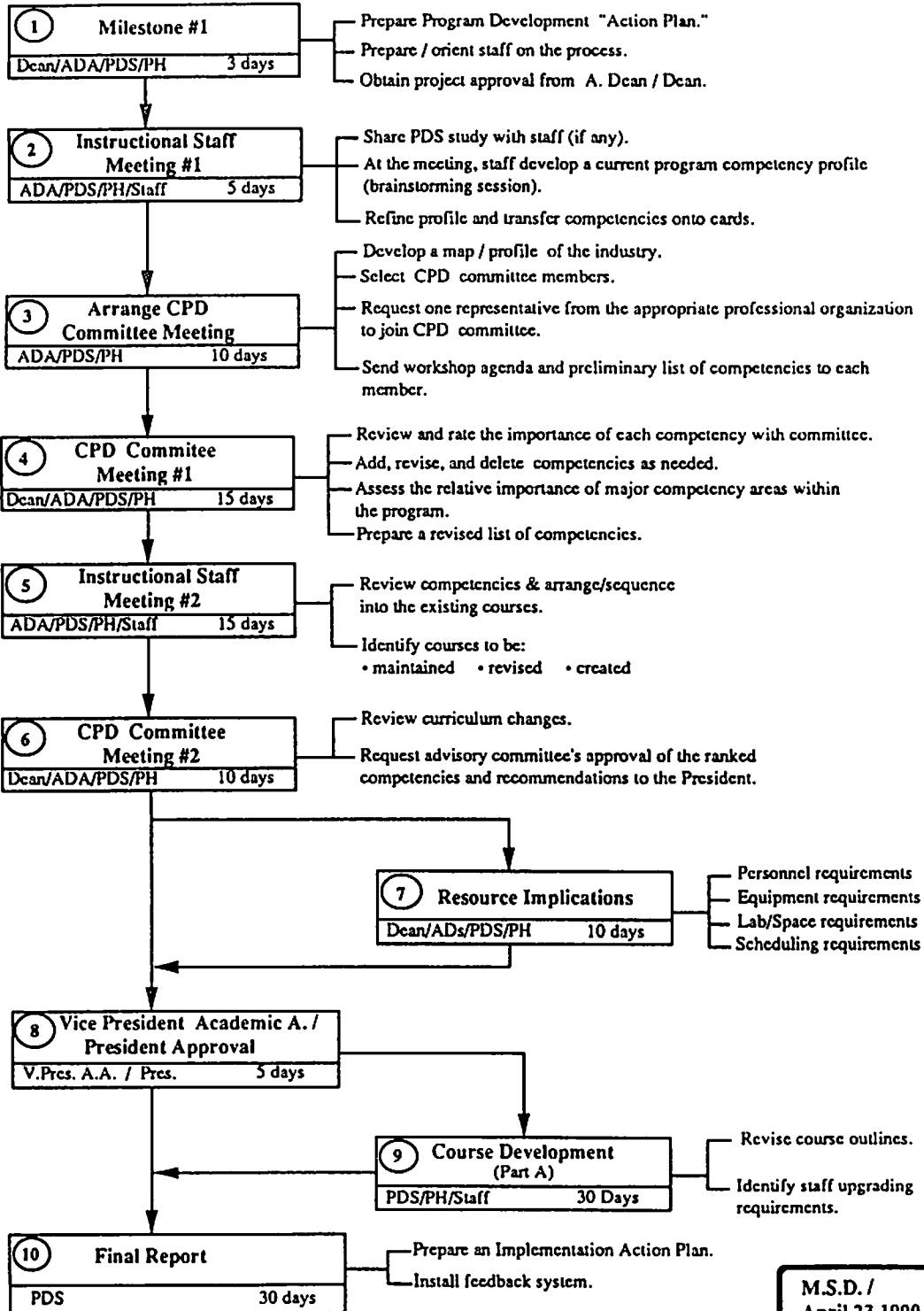
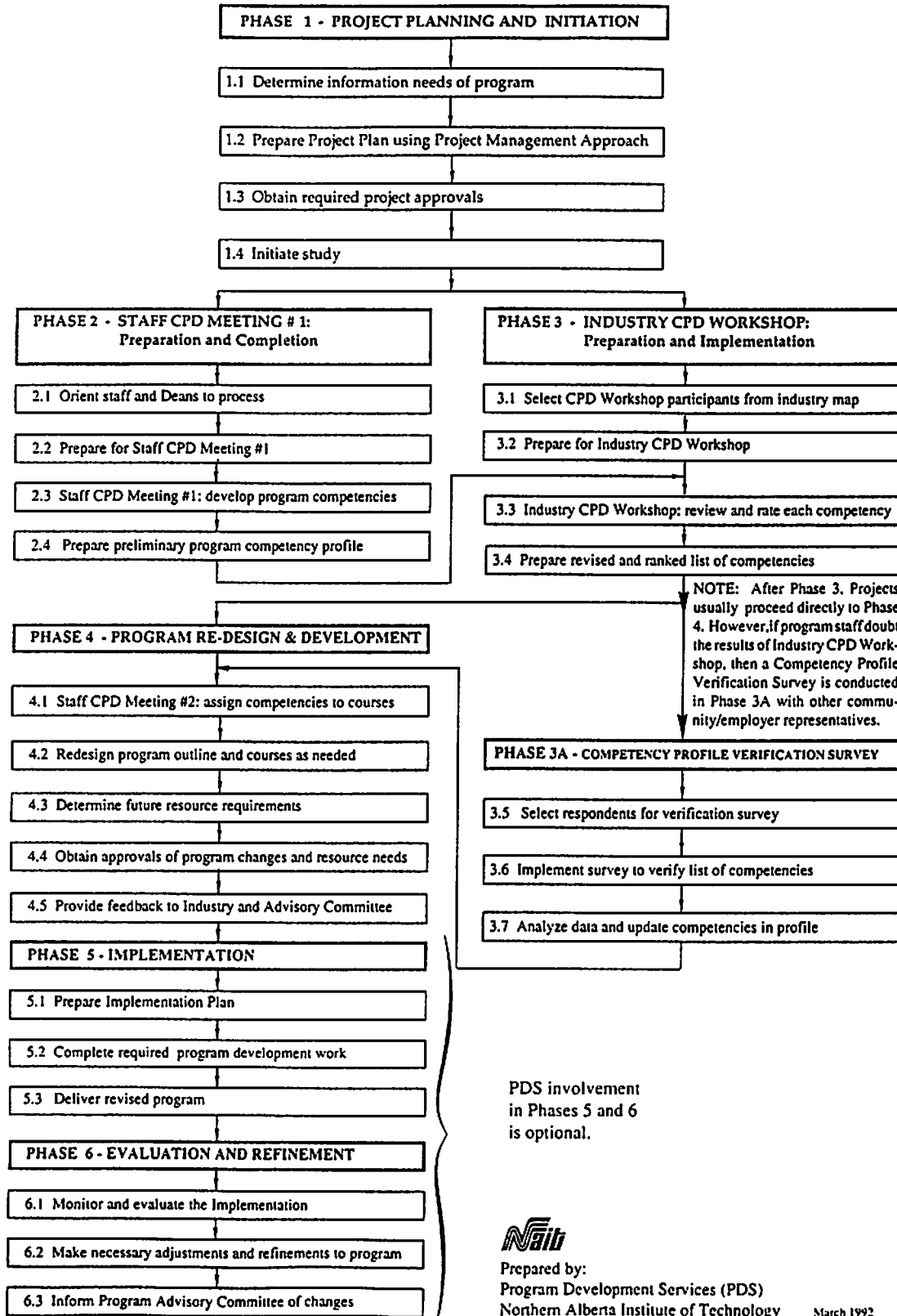


FIGURE 1: COMPETENCY PROFILE DEVELOPMENT (CPD) MODEL FOR VALIDATING AND UPDATING CURRICULUM



Prepared by:
 Program Development Services (PDS)
 Northern Alberta Institute of Technology

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