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AUTHOR	RICE, GARY A.
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ABSTRACT

THIS STUDY SOUGHT TO DETERMINE WHETHER SIGNIFICANT DIFFERENCES EXIST BETWEEN SUCCESSFUL STUDENTS AND DROPOUTS IN TERMS OF MEAN GRADE POINT AVERAGES (G.P.A.'S) IN EACH COLLEGE DEPARTMENT, AND TO ASCERTAIN CCMPOSITE COURSE EVALUATION PATTERNS ON AN INTRA- AND INTER-DIVISIONAL BASIS. THE STUDENTS INVOLVED IN THIS STUDY WERE THE SAME AS THOSE WHO WERE INVOLVED IN AN EARLIER STUDY CONTRASTING SUCCESSFUL STUDENTS AND DROPOUTS AT WASHINGTON'S YAKIMA VALLEY COLLEGE (ED 030 416). SOME CCMPARISONS AMONG THE FINDINGS OF THE TWO STUDIES WERE MADE. A SIGNIFICANT DIFFERENCE (P<.01) WAS FOUND TO EXIST BETWEEN SUCCESSFUL STUDENTS AND DROPOUTS IN EVERY DEPARTMENT EXCEPT FOR PRACTICAL NURSING AND GERMAN. IT WAS CONCLUDED THAT A REAL DIFFERENCE EXISTED BETWEEN THE DICHCTOMCUS CRITERIA ALTHOUGH THE DIFFERENCE CCULD NOT BE IDENTIFIED. GRADES IN THOSE DEPARTMENTS THAT REQUIRED ACTIVE PERFORMANCE AND MOTOR SKILLS SHOWED CONSISTENTLY HIGHER G.P.A.'S THAN DEPARTMENTS THAT HAD A PREDOMINANTLY THEORETICAL OR FACTUAL KNOWLEDGE CURRICULUM WITH PASSIVE STUDENT PERFORMANCE. (AUTHCR/MC)

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AN EXAMINATION OF THE EARNED GRADE DISTRIBUTIONS BETWEEN "SUCCESSFUL" AND "DROPOUT" STUDENTS AT YAKIMA VALLEY COLLEGE

by

GARY A. RICE

DIRECTOR OF INSTITUTIONAL RESEARCH AND TESTING

YAKIMA VALLEY COLLEGE

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INFORMATION

Research Abstract

An Examination of the Earned Grade Distributions Between "Successful" and "Dropout" Students at Yakima Valley College

December 1969

The study was initiated to accomplish a two-fold purpose: (1) determine whether a statistically significant difference existed between the "successful" and "dropout" students for mean g.p.a. in each of the 57 college departments and (2) attempt to ascertain composite course evaluation patterns on an intra- and inter-divisional basis. The subjects were the same 2061 students involved in the original study which descriptively contracted the "successful" and "dropout" student at Y.V.C. (Y.V.C. research project #68-1.) Thus, some direct comparisons between the findings of the two studies was *were* possible.

A marked heterogeneity in grading practices was quite evident. Each division had its unique characteristics and the several academic disciplines likewise were found to exhibit considerable variability.

Statistically it was determined that a significant difference of $P \geq .01$ existed between the "success" and "dropout" groups in every department, excluding Practical Nursing and German. The conclusion was reached that a real difference existed between the dichotamous criteria, although it could not be currently identified.

Grades in those departments which required active performance and motor skills had consistantly higher mean g.p.a.'s than departments which had a predominantly "theoretical" or factual knowledge curriculum with passive student performance.

The college staff will hopefully address themselves to the many perplexing questions of college philosophy, curriculum, student evaluation, etc., which have been raised in this report.

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PARAMETERS OF THE STUDY

CHAPTER I

Introduction

The culmination of the latest study Contrasting the "Successful" and "Drop-out" Student at Y.V.C. brought with it many unanswered questions and speculative implications. Although the full impact of that study has yet to be felt, one cannot be content to wait. There is an urgent need for empirical information concerning the "typical" student and his scholastic performance while in attendance at Y.V.C. Only by having an awareness of the composition of the student population can the Y.V.C. staff formulate college policy in the best interests of all parties.

Two related findings of the earlier study were startling enough to warrant further exploration and thus form the basis for this study. (The reader is encouraged to review the former study before proceeding.) First, the relationship between the students' high school grade point average and their subsequent performance at Y.V.C. was surprisingly dissident. One-fourth of the 2061 sample entered Y.V.C. with a "C" or better high school average and left with a "D" or "F" average. The second significant finding which bore on the decision to initiate this study was the observation that the students' declared major, and hence the division of initial enrollment, had a significant bearing on the likelihood of "successful" completion of one's stated objectives.

Goals and Hypotheses of the Study

The study was instigated and designed with the anticipation that several hypotheses could be tested and several empirical goals would be realized:

1. Identify the average g.p.a., standard deviation, and number of "successful" and "dropout" enrollees in each of the 57 designated departments at Y.V.C.

2. Establish each departmental mean, standard deviation, and N.

3. Determine whether a statistically significant difference exists between the "successful" and "dropout" students for mean g.p.a. in each of the 57 college departments.

4. Discover whether a statistically significant difference exists between each departmental mean and its divisional mean.

5. Ascertain the percentage of A, B, C, D, and F grades earned by "successful" students in each department.

6. Ascertain the percentage of A, B, C, D, and F grades earned by "dropout" students in each department.

7. Develop inter- and intra-divisional composite grading profiles earned by students in the sample.

The goals cited above were predicated on several hypotheses which were formulated as a result of the original dropout study and information from the college staff. The hypotheses which follow were, of necessity, quite descriptive and heuristic since there were no consistent criteria to serve as reference points and guidelines.

The first and probably most predictable statement of relationship likely to occur will be a significant interdivisional difference between the mean g.p.a. values. This could quite likely be anticipated due to differences in curricula, instructors, student ability level, motivation and a host of related factors. A related second hypothesis will likely divulge that the intra-divisional (departmental) variability as reflected in mean g.p.a. will be as significantly divergent as the inter-divisional differences. Should these two tentative hunches be confirmed, one is faced with the dilemma whether the heterogeneity of grading patterns is an accurate reflection of student ability

and performance or has been influenced by other factors. No attempt is made at this point to weigh the merits or demerits of any particular grading practice or philosophy. The only ostensible purpose is to depict the extreme variability of grades throughout the entire college.

A second set of related hypotheses concerned the grade performance of the "successful" and "dropout" students respectively. It is anticipated that a statistically significant difference will exist between the mean g.p.a. of both groups within each of the 57 departments. The null hypothesis of no significant difference at the .01 level of confidence will be advanced and any situation where it is confirmed could be most revealing. A corollary hypothesis would be that the variability of grades, as reflected in standard deviation values, will be greater for dropouts than for successful students. Assuming that the four hypotheses posed earlier are substantiated, the findings should give the college reason to review its entire grading philosophy within the fabric of its stated purposes and functions.

Subjects and Sample Size

The subjects for this study were the 2061 students in the sample which provided data for the original report contrasting the "successful" and "dropout" student at Y.V.C. The reader is referred to that study for a complete explanation of the criteria and method utilized in selecting the sample and their biographical and/or descriptive characteristics.

The "success" subsample contained an N of 700 composed of the three criteria established earlier. The "dropout" subsamples contained 1361 students. The estimated total number of grade cards for the former and latter subsamples was

18,000 and 20,000 respectively. The reason that the number of grade cards is almost equal for the two subsamples despite the fact that "dropouts" outnumber "success" about two to one is the latter group remain at Y.V.C. longer and hence complete more classes than the former.

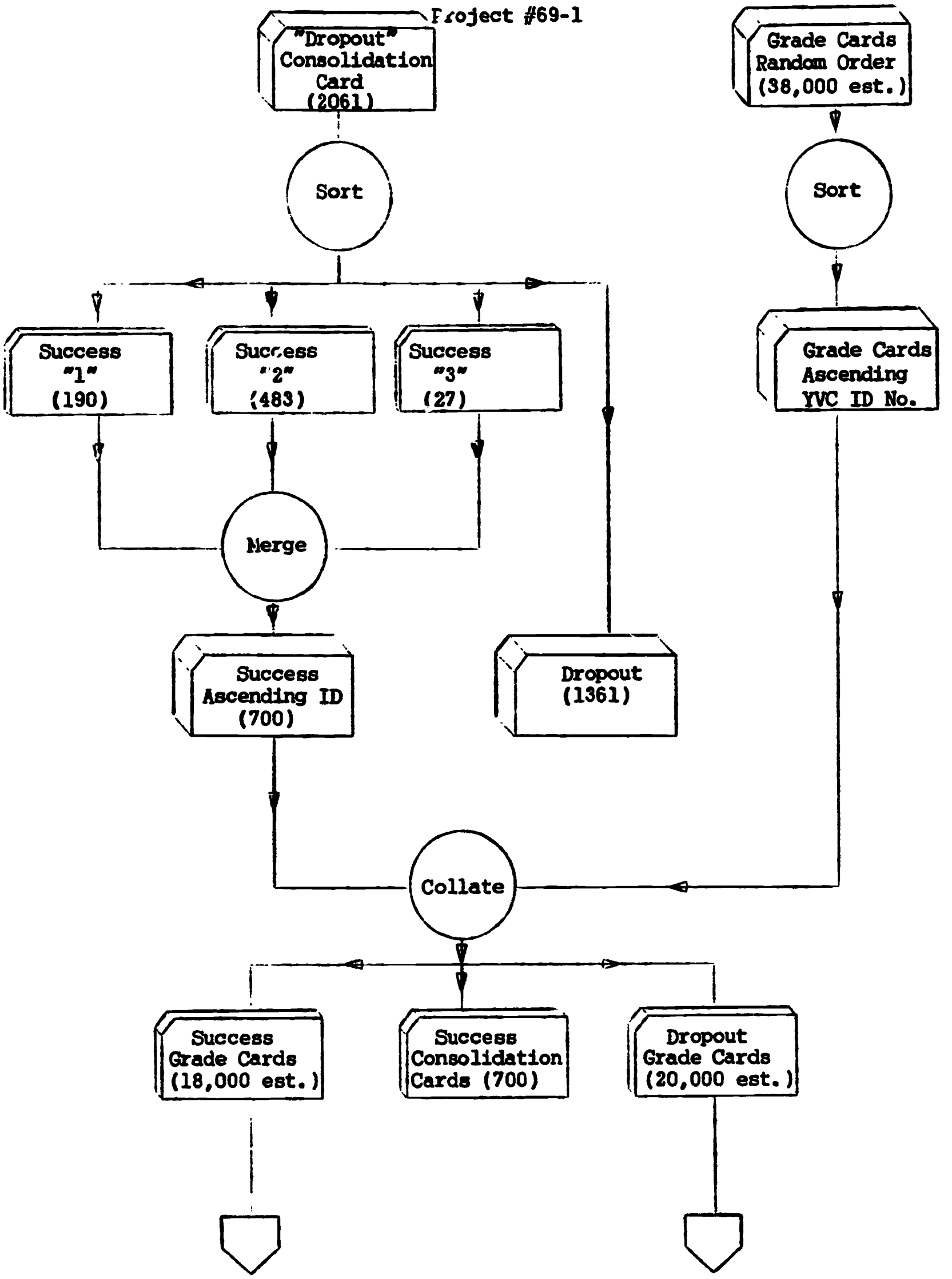
The subjects were chosen for two reasons: (1) The grade cards for all of these students were prepared as part of the original study but could not be utilized because of insufficient funds. Suffice it to say this drastically reduced the cost factor and the time necessary to complete the project. (2) Since the same students were involved, some direct comparisons could be made between the findings of the two studies. Thus the two reports supplement each other and provide additional information to the college for current and future decisions.

Methodology

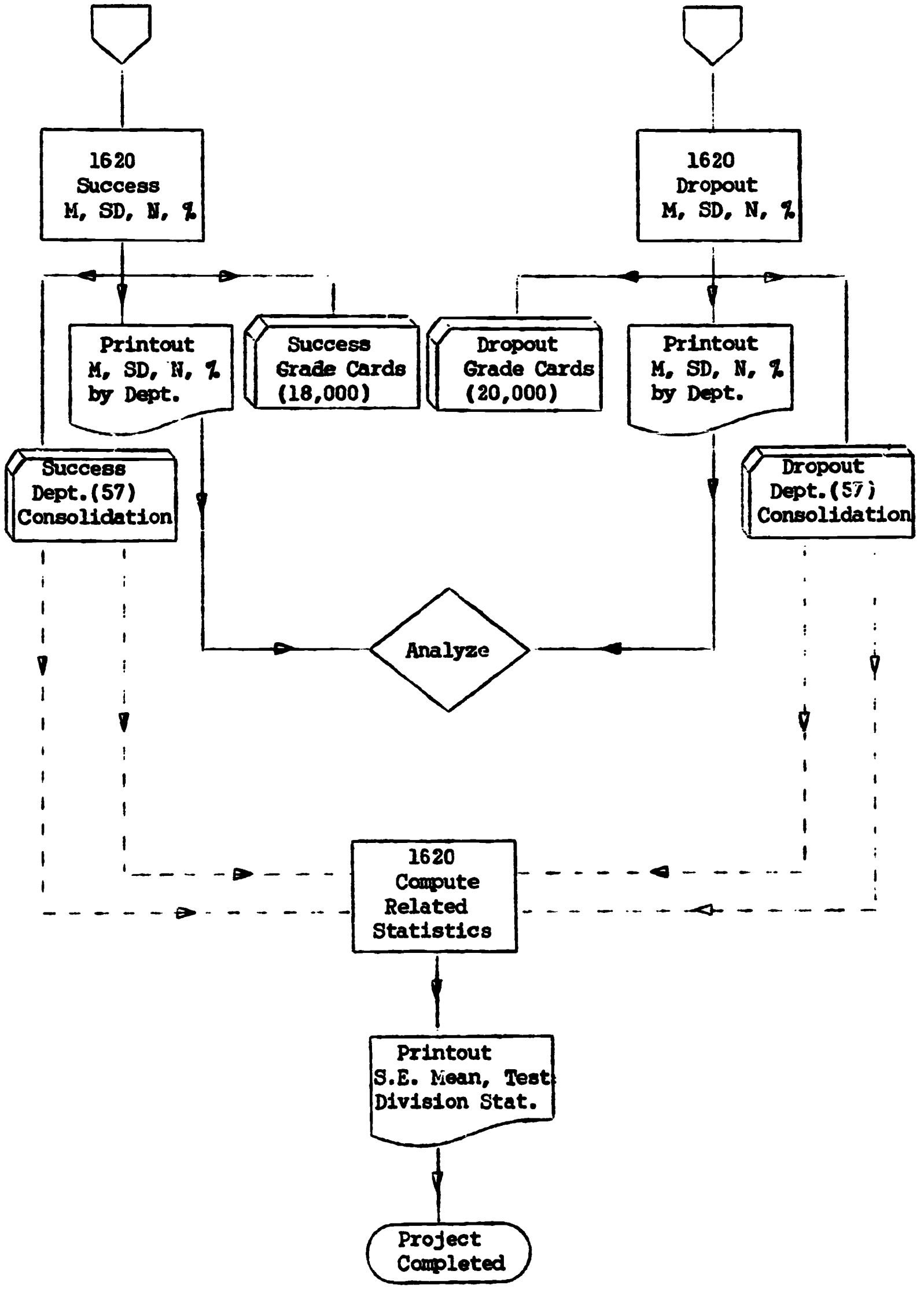
In this section the design of the study will be described. The procedural flowchart which follows graphically depicts the steps employed to gather the data and provides a visual guideline for possible replication.

The first step in the study utilized the original study deck of 2061 consolidated information cards arranged in ascending order sequence by Y.V.C. I.D. numbers. On a single pass through the sorter, the deck was divided into the "dropout" and three "success" categories. The latter subgroups were then merged into one "success" deck also in ascending order sequence.

Figure 1
Procedure Flowchart
Project #69-1



Procedure Flowchart (Continued)
Project #69-1



Once the deck had been dichotomized, the next step involved a collation between the "success" deck and entire deck of 38,000 grade cards. The grade cards had been arranged in ascending order as well. The output of the collator placed the "success" identifier cards in one hopper and the corresponding "success" grade cards in a second hopper. The third hopper contained the unmatched grade cards and were the deck of "dropout" grade cards.

Having obtained two decks of grade cards, one for the "success" subsample and the other for the "dropout" subsample, the third step involved programming the 1620 computer at Y.V.C. to read each deck separately and place the earned grade from each card into one of 57 previously defined, mutually exclusive categories. At the termination of each deck, the computer provided the N, mean, standard deviation, and percentage of A, B, C, D, and F grades for the "success" and "dropout" group for each department. In addition, the computer was requested to punch a single card for each department for each subgroup containing all of the above information plus the total number of credit hours and total number of earned grades. This latter action reduced the number of IBM cards down to 57 for each subgroup and they were utilized to compute divisional mean and standard deviation values, standard error of each subgroup and departmental mean, and tests of statistical significance within and between departments on subsequent passes through the computer.

Cautions

A study of this type, because of its enigmatic and personal nature, is one which is likely to arouse a fisceral reaction among the college staff. For this and other reasons of proper research, it is necessary to present a series

of qualifications and limitations which the reader should keep in mind while perusing and reflecting on the results contained within this report. It is possible that one can qualify and provide contingencies to the point of ubiquity which would destroy any potential validity or meaning. Therefore, the stated limitations will not be exhaustive and the reader is free to query or challenge any data contained herein.

First, the study was not done to embarrass or pique any individual or group and the findings should not be used in any manner of coersion, proscription, or intimidation. The implications drawn by the author on many of the findings were made to provoke thought, discussion, and reaction as well as provide descriptive information. This should be considered before violent action is taken.

This project, like the one preceding it had, as one of its major purposes, a descriptive look at the performance of a substantial sample of the student population with an attempt to identify "typical" performance if it, in fact, exists. It must be recognized, however, that "typical" is an ideal concept and one would be hard-pressed to locate students and/or college departments which displayed that type of behavior. Thus the veracity of this report will be more beneficial when considered to identify predominent characteristics and various trends for planning purposes than for any absolute values. The report will discuss the general table trends but there is much more specific data contained within them. It would not be realistic to expect that one would peruse all of the tables in detail, but the data is accessable to questions of specific interest. Many observations can be made and conclusions or inferences drawn from the data, but all must be predicated on the initial definitions of

"success" and "dropout" which were utilized. Unless this fact is kept in mind, the entire study loses much of its meaning. Also, the reader must use care not to overrate the significance of obtained values coinciding with preconceived ideas or overly berate dissident findings. The net result of such actions would be to polarize positions, reduce staff communications, and destroy any benefits which may accrue from this endeavor.

The findings, in many instances, substantiated what had been traditionally felt to exist, which should be gratifying to those who previously had occasion to utilize similar data for various decisions. In most instances such data was gleaned from feelings, judgment, "common sense", opinion, intuition, and serendipity. Not all of the results were anticipated, however, and the implications of the obtained data should give the staff cause for reflection, pondering, and intra-college debate.

One of the most important features to consider when examing this report is the size of the N upon which the various statistics are based. The smaller the N, the less reliance can be placed on any obtained value. The data contained within the tables reporting the mean, standard deviation and standard error of the mean was reported regardless of the N because of the interesting findings which transcended but do not negate the potential error. However, the data on tables reporting the tests of statistical significance were excluded if the N in any category was less than 75.

Although it may seem a reiteration of the obvious, this study makes no claims or pretense of containing sacrosanct truths or being the Neo-New Testament, but every effort was made to make the data valid and meaningful within

the stated parameters and context. It is fully acknowledged that the paradigm is not sophisticated, but it was not intended to be. There was no attempt to ascertain WHY in this study, only WHAT. This Gordian knot of grading practices will never be unraveled until a group of dedicated professional educators and lay persons alike address themselves to the many complex facets of the problem.

In addition to the error introduced because of small and varying N values, a second source of contamination involved the course grouping within each department. Due to technical and financial restraints, it was necessary to combine all courses offered by a given department within that discrete category regardless of the course content. (For a description of the various courses included in each departmental category, refer to the 1966-67 and 1967-68 college catalog published by Y.V.C.) Thus the calculated mean and standard deviation values really represent a composite picture rather than a specific one. For example, combining grades earned by students in math 01 vs. math 124 will obviously produce a weighting error. An attempt to control this variable was made in the English Department, but another extenuating factor occurred there. It will be elaborated more fully in the next chapter. Besides the course numbering difficulty, the abstract level of the curricula varies both between and within college departments. A related series of factors which indirectly but assuredly influenced the outcome of the project were student motivation, academic quarter, period of the day, instructor variability, course content, student learning ability, part-time jobs, commuting, etc., plus a host of others too numerous to delineate.

Besides the cautions cited earlier plus others which may have been overlooked, salient questions of grading philosophy can also be raised which

would be germane to consider: (1) What do the earned grade distributions reflect about student performance at Y.V.C.? (2) If we can assume a random sample of Y.V.C. students are represented in each department, do the obtained grade distributions coincide with the anticipated distributions? (3) What factors were involved in deriving the obtained grade distribution within each department? (4) Do the same letter grades have identically the same meaning if earned at Y.V.C., the four-year level or graduate level, or do differing performance standards exist within the same lettering system to fit the student population one confronts? (5) Should the grading philosophy, standards and practices in the various areas and campus-wide be modified or remain static? and (6) Since apparently different criteria are utilized to evaluate "success" in the vocational-technical curricula vs. the academic offerings, should the grading practices also differ?

There are undoubtedly many other queries which can and should be raised as a result of this study. The entire concept of performance evaluation and grading practices encompasses so many subtle complexities and facets and has such ramifications it would be folly to consider that a superficial study such as this would resolve the perplexing issues involved. However, it would be just as erroneous to consider all of the stated limitations as signs that this study is devoid of meaning.

CONTRASTING THE "SUCCESSFUL" AND "DROPOUT" STUDENT BY AVERAGE GRADE PERFORMANCE

CHAPTER II

Introduction

This chapter will concern itself with a comparison of the mean g.p.a. between "successful" and "dropout" students by department and division at Y.V.C. In addition, the standard deviation and standard error of each mean value is also available for examination. A scrutiny of the tables should provide a coarse overview of the existence and extent of divergent grading practices and, inferentially, the policies and philosophies throughout the college.

The most salient point to keep in mind throughout this and succeeding chapters is the size of N upon which the statistical values are derived. Any obtained value based on $N \leqslant 50$ should be suspect. Also, the greater the N the more credence can be placed on the inferences drawn with respect to the subjects which the data represents. Finally, the N does NOT represent the number of students taking courses in any department but only the number of grades earned by each subgroup. As an example of the way the data should thus be viewed some hypothetical values will be presented for the XYZ Department. For the "success" and "dropout" subgroups the following values will be given in respective order: N = 500, 700; M = 2.20, 1.50; and S.D. = .80, 1.00. Interpretatively one could say that 500 grades were earned in the various courses of the XYZ Department by students who were subsequently designated as "successful" according to the criteria of the original study. Of those 500 earned grades the mean g.p.a. was 2.20 and the standard deviation was .80. Likewise, of the 700 grades in XYZ courses earned by students later classified as "dropouts", the mean performance was 1.50 and the S.D.

was 1.00. The departmental values are a composite of the two subgroups with a weighting toward the largest N in each instance.

In an attempt to go somewhat beyond the obtained values the standard error of each mean value was computed. Since it is recognized that the calculated means only represent the value for the subgroups and/or department one could question the limited applicability of the data. However, if it can be assumed, for example, that each departmental mean represented a randomly selected, normally distributed sample, then the standard error would allow one to project to a population of courses of which this derived departmental mean value was a sample. For example, if the XYZ Department mean g.p.a. was 2.00 with a standard error of .30, one could reasonably expect that under the assumptions stated above, the XYZ mean for all students from which the sample was drawn who took XYZ courses would fall between 1.70 and 2.30 two-thirds of the time. It will be observed that there is a negative correlation between the N size and S.E. size, i.e. as the N becomes larger the S.E. diminishes and vice versa.

A final point to consider when reading the following tables concerns the relationship between the obtained mean values for the two subgroups in each college department. To test the null hypothesis (H_o) of no significant difference between the "success" and "dropout" subsample means for each department a statistical T test for two independent samples was employed. A two-tailed test with $P \geqslant .01$ was established prior to the calculations. A series of tables containing the S.E. of the means df, and T value for each department appears in Appendix B for the interested reader. The underlying assumption was that the H_o: Msuc = Mdrop would be rejected in all departments which

would lead to the alternative hypothesis H_a: Msuc ≠ Mdrop. The stated H_a would be that the obtained differences were real and could have occurred by chance only beyond the established level of confidence. In this case the odds of chance values occurring would be $\geq$ 1 in 100. Conversely, the odds would be 99 out of 100 that the difference between the two subsamples mean values was a real one.

The statistical calculations bare out the underlying assumption because the H_o was rejected and the H_a accepted in almost every department. The only exceptions were Practical Nursing and German. Thus, the dichotomous classification apparently represents a real difference between the student performance rather than being artificial.

An average of the departmental means was computed to obtain a divisional mean and standard deviation. This value provided a reference point for intra-divisional comparison. It needs to be strongly reiterated, however, that there were many factors which combined to produce the earned grades so the values should not be considered in any absolute sense such as "easy graders", "flunkout department", etc., unless the values represent extreme deviations from the divisional and/or college g.p.a. The purpose is to provide grist for the mill rather than turn the findings into a popularity contest/witch hunt.

Average Grade Point by Division and Department

Table I following is a comparison of the several divisional mean g.p.a. and standard deviation values. A cursory examination discloses that more than one-half of the divisions have a g.p.a. below 2.00 and a standard deviation

of approximately 1.00.

TABLE I

A Comparison of Divisional Mean
G.P.A. and Standard Deviation Values

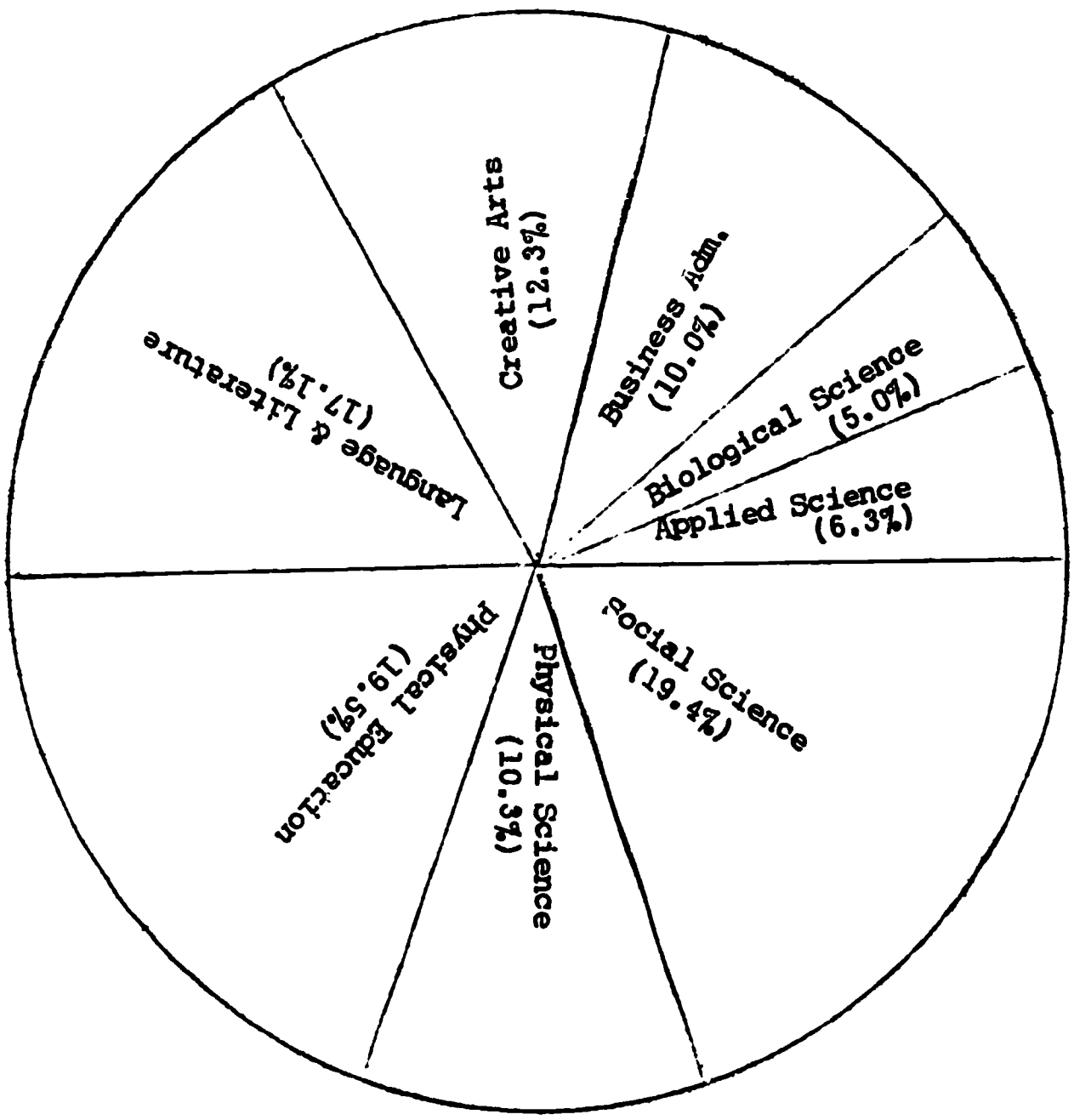
Division	No	Mean	St. Dev.
Appl. Sci.	2152	2.48	.99
Biol. Sci.	1706	1.98	1.02
Bus. Adm.	3395	1.99	.98
Creat. Arts	4184	2.36	.97
Lang. & Lit.	5836	1.69	1.02
Phy. Ed.	6634	2.62	.98
Phy. Sci.	3519	1.79	1.15
Soc. Sci.	6614	1.72	1.08

The 1.69 g.p.a. for the Language and Literature division is spurriously low and the reasons for this will be developed in the section which specifically discusses performance in that division.

Figure 2 quite dramatically depicts the contribution of each division to the total number of grades earned by the 2061 students in the sample. The final number of grades which could be utilized for purposes of this study was 34,040. The discrepancy between the original estimate of 38,000 and the 34,000 could be accounted for by those courses which did not alter one's g.p.a., i.e., audits, English 10 and Psychology 11 "P" grades, withdrawal passing cards, etc. An examination of the graph reveals that three divisions,

Figure 2

Proportion of the Total Number of Grades
Earned in Each Division
N = 34,040



Social Science, Physical Education, and Language and Literature, have more than one-half of the grades. The addition of Creative Arts and Physical Science pushes the figure to 80% leaving the remaining three divisions to produce a combined total of only one-fifth of the grades.

The large percentage figures in Language and Literature, Physical Education, and Social Sciences with somewhat lesser percentage values in Physical Science and Creative Arts (Humanities) indicates that most students are taking courses in conformity with minimum requirements for transfer to the four-year institutions. The fact remains, however, that only 10% of the students do transfer to another school. Again one must return to the nagging question concerning the relevance of the curricular offering at Y.V.C. for the type of student who enrolls here.

Another factor, discovered in the original study, which should be considered is the division choice of students with varying levels of high school performance. The students with declared majors in the Physical Sciences or Language and Literature had significantly higher H.S. g.p.a.'s than would have been expected by chance while Applied Science, Business Administration, Physical Education, and the Undecided, (usually Social Science initially) students had cumulative H.S. g.p.a.'s much lower than chance. Assuming accurateness of evaluation at the high school and relative comparability of curriculum difficulty level between Y.V.C. divisions, one would expect that this difference would reflect itself in subsequent college performances.

APPLIED SCIENCE

This division had the second highest college mean g.p.a. exceeded only by the Physical Education Division. The small N's necessitate the tempering of

Table II

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Applied Science Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Aero	32	140	2.58	2.98	2.90	1.08	.58	.71	.19	.05	.05
Agr	302	430	3.11	2.04	2.48	.80	1.05	1.00	.05	.05	.04
Auto	125	37	2.99	2.13	2.79	.89	1.06	.95	.08	.18	.07
C. Engr	10	ND	2.20		2.20	1.11		1.11	.37		.37
D. P.	81	46	2.54	1.65	2.22	.96	1.22	1.06	.11	.18	.09
Elec	326	65	2.70	1.53	2.51	.87	.96	.89	.05	.12	.04
Gen Engr	253	203	2.52	1.89	2.24	1.05	1.15	1.11	.07	.08	.05
Tec Draw	14	1	2.14	4.00	2.26	1.09	0.00	1.05	.30		.28
Voc Agr	ND	23		2.40	2.40		.54	.54		.12	.12
Voc Auto	4	2	4.00	4.00	4.00	0.00	0.00	0.00			
Voc Educ	11	24	3.02	2.47	2.64	1.18	1.01	1.09	.37	.21	.19
Voc Elec	2	8	2.50	2.29	2.33	.50	1.00	.85	.50	.38	.28
Voc H. M.	ND	8		2.62	2.62		1.26	1.26		.47	.47
Weld	ND	5		3.41	3.41		.49	.49		.25	.25
Division	2152			2.48			.99				

ND = No Data

many conclusions although some definite observations can be made.

The first thing to draw attention is the higher g.p.a. for "dropouts" than "success" in Aeronautics. The probable explanation is related to the criterion definition of "dropout" Students in this program might complete their flight training and move on to training programs with various airlines, etc., yet not compile enough supplementary total hours at Y.V.C. to be classed as "successful".

It is interesting that departmental mean values range from 2.20 to 4.00. This is somewhat surprising in lieu of other studies, (Lunneborg and Lunneborg, 1967) that the test variables traditionally considered to measure satisfactory academic performance do an equally good job in predicting the likelihood of vocational success. In fairness, however, the original study (pg 54-55) cited a paper by Lunneborg and Langen which indicated grading practices may be based on entirely different factors for courses in the "theory" area vs. "applied technical" area. If this is the case, a germane question could be raised about the plausibility of utilizing the same notation system of A, B, C, D, F which implies comparability of measurement when, in actuality, different performances based on different criteria are being assessed. The same question can be raised regarding the comparable meaning of a "C" grade in a two-year non-transfer course vs. a two-year transfer course vs. the same course at the university level vs. a graduate level course. Does the "C" mean the student performed at the same level in all courses or does the grade reflect the student population one is compared to? Without digressing further on this point it should be obvious that the letter grade and hence mean departmental values should be considered relative to several norm groups, rather than taken in any absolute sense.

The variability of grades for the two subgroups, as reflected in the S.D.

values, is not consistent but varies between departments. This heterogeneity is difficult to explain since it appears that there is much diversity in grading within the division. The values range from well over 1.00 in several departments to 0.00 in Vocational Auto.

The fact that many of the "vocational" designated areas have more grades for "dropouts" than "success" while the established two-year technical programs show the converse may have some implications for the college in terms of the likelihood of certain students to gravitate toward those areas.

BIOLOGICAL SCIENCE

The division mean and standard deviation are undoubtedly influenced by the Biology Department since it contains almost 43% of all grades earned. The prerequisite requirement is seen in the lower number of grades earned in departments requiring it as well as the higher g.p.a. values. Even though Biology 101 is apparently taking a heavy toll it appears to be serving its intended purpose.

The reasons for the higher mean in the Practical Nursing "dropout" subgroup is unknown at this time. The fact that admission screening procedures are employed for this program should lend even more question to the findings.

There appears to be more interdepartmental consistency in the S.D. values for this division than for the preceding one. An obvious factor contributing to this consistency would be staff size and the number of courses taught in different departments by the same instructor.

Both nursing programs are conspicuously above the divisional average. One can query how much these values have been influenced by screening procedures and/

Table III

Mean G.P.A. Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Biological Science Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Biol	383	348	2.09	1.09	1.61	1.03	1.02	1.05	.05	.05	.04
Botany	89	25	2.47	1.40	2.24	.96	.88	.95	.10	.18	.09
Forest	17	41	2.65	2.07	2.24	.85	.97	.96	.21	.15	.13
Home Ec	114	170	2.34	1.67	1.94	.75	.96	.90	.07	.07	.05
Physiol	58	30	2.36	1.39	2.03	.82	.88	.85	.11	.16	.09
P. Nrsg	98	80	2.62	2.76	2.68	.80	.73	.77	.08	.08	.06
Reg Nrsg	98	22	2.73	2.25	2.64	.73	.79	.74	.07	.17	.07
Zool	110	18	2.37	1.17	2.20	1.04	1.01	1.04	.10	.21	.09
Division	1706		1.98			1.02					

or block scheduling of specially designated classes for nurses. The latter possibility becomes quite influential, especially during the second year, when less than average performance in any related area by the student jeopardizes their chances of becoming a nurse. This implication is not lost on an instructor of a small college who is required to indirectly evaluate their potential as a nurse as well as their performance in his specific class. This in no way impunes the instructor's professional integrity and grading honesty but he is, after all, a human being and subject to extracurricular pressure.

BUSINESS ADMINISTRATION

The first point of note in surveying this table is that the divisional mean is again greatly influenced by one department with a large N. The earlier study indicated that approximately one student of every five initially enrolled in this particular division and the number of earned grades discloses that the majority are in the Business Administration Department.

The number of "dropout" grades almost doubles the "success" grades in the B. A. Department. Apparently, the popular appeal which attracts many students initially is suddenly replaced with the harsh reality of a challenging curriculum.

The Secretarial Training Department also has "dropout" grades doubling the "success" subsample grades but the means are both much higher than the other departmental values. The higher N for this group suggests that many students just took courses in this area for interest and personal improvement before leaving the college. It is quite conceivable that this department, like Aeronautics, may have been adversely affected by the original criterion category definitions.

Table IV

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Business Administration Division

Dept	N		Mean			St Dev			SE Mean		
	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Bus Adm	686	1107	2.29	1.52	1.82	.90	1.06	1.03	.03	.03	.02
Econ	450	324	2.26	1.64	2.00	.78	.87	.83	.04	.05	.03
Real Est	ND	ND									
Sec Tr	240	588	2.83	2.18	2.37	1.00	1.09	1.08	.06	.04	.04
Division	3395				1.99			.98			

ND = No Data

Turning to the measures of grading variability, the Economics Department seems to have a more limited spread of grades than the others. Whether this is the result of grading practices within the department or due to an unusual student group taking economics courses is not known.

CREATIVE ARTS

One's attention is immediately drawn to the fact that all seven departments comprising this division have departmental means exceeding 2.00. Also, all of the "success" subgroup standard deviation values show less variability than the "dropout" grade dispersions. A little closer analysis of the obtained mean values produces many points of conjecture. Excluding Photography which provides some very interesting mean values but is based on an insignificant N, one is confronted with inconsistency between departments. For example, Drama has the second highest "success" subgroup mean yet ranks next to the lowest in the "dropout" category. The fluxuations are seemingly accounted for by instructor grading practices since there is little overlap of multi-departmental instruction by the Creative Arts staff.

Music and Speech contain the largest number of earned grades and, quite likely, the greatest number of enrollees. The former stands out with a "B" average for 653 grades and a 2.71 based on an N of 1200. The weighting of Music "activity" to "theory" courses isn't known although one could speculate that the activity courses were predominant.

At the time the bulk of the sample for this study was drawn, Introduction to Public Speaking (Speech 140) was required for admission to C.W.S.C. and most entering freshmen stated their intent to transfer there. Thus it is

Table V

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Creative Arts Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Art	382	606	2.59	1.76	2.08	.85	1.07	1.02	.04	.04	.03
Drama	58	92	2.82	1.81	2.20	.98	1.14	1.13	.13	.12	.09
Human	246	169	2.43	1.83	2.19	.77	.81	.80	.05	.06	.04
Journ	121	102	2.65	2.03	2.37	.95	1.15	1.07	.09	.11	.07
Music	653	548	3.01	2.34	2.71	.84	1.21	1.03	.03	.05	.03
Photo	7	2	3.14	4.00	3.33	.72	0.00	.64	.29		.23
Radio-T.V.	ND	ND									
Speech	592	606	2.62	1.99	2.30	.83	1.01	.94	.03	.04	.03
Division	4184				2.36			1.00			

ND = No Data

probable that this single course, although taught by several instructors over the time period included in the study, carries undue weight in influencing that department's results. Both Speech and Journalism Departments approximate the divisional mean.

The Humanities Department, which consists of a series of three courses taught in a three-quarter sequence, appears to provide the least amount of grade variability both between the two subgroups and as a department vs. the computed divisional S.D. value of 1.00. Since this is a large group lecture class with no prerequisites, there is no reason to assume that the grades represent factors from a unique population. Thus the explanation for this apparent homogeneity is currently elusive.

The overall heterogeneity within this division is partly accounted for by a large, highly specialized staff. However, there are undoubtedly other subtle, intangible nuances which combine to produce the grade. In many respects the methods and techniques for assessment of student performance in the various skills required for success in this division appear to parallel or coincide with measures in the Applied Science Division. Also, it has not escaped attention that measures in areas requiring a greater degree of subjectivity by the instructor are consistently higher as a whole than in those divisions and departments where the measures are based primarily on theoretical/factual knowledge. Related to this is the abstract level of concept formation one is required to have to perform satisfactorily in each discipline. Again the question is posed whether the same yardstick should be applied for both types of performance and, assuming the reply is negative, which criteria are more accurately measured by the existing techniques?

Language and Literature

Probably the most frightening statistic revealed during the entire project occurred in the data for this division. The English Department has long been acutely aware of the students' deficiencies in basic English and communication skills and has taken the initiative to reach each individual regardless of demonstrated ability level. When the computer returns were in the mean values for the non-transfer program were problematical until further exploration and discussion with the English staff resolved the issue. The majority of the sample matriculated at Y.V.C. at a time when the English program consisted mainly of composition courses and literature. The student was initially granted or denied admittance on the basis of certain Washington Pre-College Test critical cutting scores. If the student failed to meet the minimum score he was required to take a remedial English (English 10) course and pass it before being allowed to enroll in college transfer English. The grades for English 10 consisted of "P" or F. When setting up the computer program the instructions were to include only those grades which affected one's g.p.a. Thus, only those "F" grades were tallied since "P" didn't effect the cumulative g.p.a. The only reason a mean value of 0.00 did not occur was that the department instigated a developmental grade (English 50) program in Fall quarter 1967. Thus the reported values for this particular department should probably be voided. This state of affairs would also tend to lower the divisional mean g.p.a. although a cursory examination of the remaining departmental means would not place the divisional value much above 2.00 even if this departmental data were removed.

Acknowledging the plausability of the explanation cited above, a deeper

Table VI

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Language and Literature Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Engl *	167	578	.30	.14	.17	.75	.52	.60	.06	.02	.02
Engl Comp **	1779	2150	2.19	1.51	1.82	.87	1.02	.97	.02	.02	.02
Engl Lit	349	226	2.56	1.63	2.20	.94	1.11	1.02	.05	.07	.04
French	92	04	2.26	1.19	1.82	1.26	1.09	1.21	.13	.14	.10
German	81	47	2.17	1.68	1.99	.92	1.23	1.05	.10	.18	.09
Spanish	138	165	2.98	2.09	2.49	.93	1.11	1.06	.08	.09	.06
Division	5836		1.69			1.02					

* All non-transfer English courses

** Engl 101, 102, 103, 121

reflection reveals a question which also must be asked, namely, what happened to these students in their other courses? If the high failure rate in English is accompanied by equally poor or minimal performance in other course work, then a hypothesis can be made about the students' basic academic ability. If, on the other hand, these students are capable of performing adequately in other courses, remedial or otherwise, then the alternatives are either inaccurate placement or an examination of the goals and methods in the remedial English program.

Like Biology and Business Administration we find a single department, English Composition, containing the majority of the earned grades and influencing the other values, especially the division totals. The obtained statistics disclose the four composition courses are exacting their toll. With an N of almost 4000, or about two-thirds of all earned grades in this division, the average grade is 1.82. When this is coupled with broadly interpolated values of student performance in the developmental non-transfer courses a series of cogent queries are raised. Would this be expected on the basis of measured high school performance? How adequate was the student's elementary and secondary school preparation? Is the composition course content serving the purposes it was designed for? Is the student benefitting from instruction? Are the evaluation practices consistent within this department and are the methods and techniques of measurement appropriate to the task? In fairness it should be pointed out that the entire college staff would do well to address themselves to the same questions.

Apparently there is some connection between "successful" performance in English Composition and subsequent performance in English Literature. It

will be recalled that the better ability students in high school tended to gravitate towards this division which will have some bearing on the relationship. Also, the same instructors teach in both areas which will introduce some error variance. The table discloses that there is a greater discrepancy between the two subgroup means for English Literature than for English Composition. The increased variability of grades in the upper level courses tends to be the converse of what occurs in grading trends with advancing level of proficiency at the four-year level. No doubt such considerations as the lack of formally stated prerequisite courses for admission to the Literature courses, class closures during registration which force the student into courses he might not otherwise have taken, predominately three-credit courses at prime class hours which are utilized to complete one's class schedule regardless of need, etc., must enter into the resultant grade dispersion.

The Spanish Department has the highest subgroup and departmental g.p.a. in the division; the "success" group had almost a "B" average while the "dropout" group maintained a "C" average. This was not totally unexpected in view of the number of Spanish-speaking students from the lower Yakima valley who enter Y.V.C. and take this course sequence. It should be noted at this point that all of the foreign language departments have a two-year sequence of courses with concurrent and/or subsequently offered literature courses in each language. This prolonged contact with the student seemingly enables the instructor to form a more complete opinion of their performance than would be possible with the majority of single or double contact courses offered in most divisions.

The standard deviation values for the various departmental subgroups conform to the pattern of the two previous divisions, i.e. there is less variability

for the "success" group than for the "dropout" group. French, however, provides a notable exception. Not only does this department have the largest degree of departmental variability as compared to the divisional value but one is also struck by the fact that although the deviation for the "dropout" subgroup is not unique the "success" subgroup value is noticably deviant from the others. Whether this was serendipity or the result of extraneous factors one cannot say.

PHYSICAL EDUCATION

This division took top honors in the college having both the highest mean (2.62) and lowest standard deviation (.98). The Health Education courses played a minor role in the determination of the divisional values since 75% of the earned grades were in Physical Education. The vast majority of grades in the latter category were obtained in "activity" courses rather than in the pre-professional curriculum. Nevertheless it is quite interesting that for 2368 earned grades the average was "B". The mean was not much lower for the "dropouts". Assessment in this area is also similar to measurement in the "applied" programs in that motor dexterity is one of the factors that is positively correlated with satisfactory performance.

Both departments have almost identical measures of dispersion for comparable categories even though a distinct difference exists in mean values between the two departments. This plus the relatively large numbers involved would seem to suggest that samples fairly representative of the population under consideration were present. Therefore the difference between 2.08 and 2.79 seems rather large but there was no determination of the statistical level of significance between them.

Table VII

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Physical Education Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Health	643	998	2.54	1.78	2.08	.86	1.02	.99	.03	.03	.02
P. E.	2368	2525	3.00	2.61	2.79	.84	1.07	.97	.02	.02	.01
Division	6634		2.62			.98					

PHYSICAL SCIENCE

The N's for each "success" subgroup exceeded the corresponding "dropout" category in every department. This was consistent with the earlier fact that the more able high school students were attracted to the physical sciences and there was less attenuation in their subsequent performance. However, it becomes quite evident that the rigors of the various disciplines soon separate the serious student from the would-be scientists.

The Mathematics Department provided the anchor point for this division with Chemistry a distant second in terms of the number of earned grades. Although the latter was second in apparent popularity it was the most stringent according to the obtained data. The need for a fundamental quantitative aptitude and mathematical knowledge were factors underlying the poor performance in Chemistry although they should not be construed to be the only ones.

A point which aroused interest was the difference between the two subgroup means for Physics and Physical Science. The former included both general and engineering physics while the latter represented a survey of the entire physical science field. The restricted sample of students who enrolled in Physics probably affects the 2.82 mean for "success" and the 2.44 departmental value which was the highest in the division. Apparently the students have had the necessary prerequisites and take the courses for a specific purpose or they aren't likely to succeed.

Geology gives the semblance of coinciding with Physical Science in terms of ultimate student performance. This was not totally expected since it, like Chemistry and Physics, is a laboratory course which traditionally gives students more trouble than the predominantly lecture courses.

Table VIII

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Physical Science Division

	N		Mean			St Dev			SE Mean		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Astro	27	21	2.26	1.14	1.77	.72	.92	.85	.14	.21	.12
Chem	452	291	1.92	1.09	1.59	1.04	1.04	1.05	.05	.06	.04
Geol	175	104	2.64	1.67	2.28	.92	1.09	1.00	.07	.11	.06
Math	1124	967	2.12	1.19	1.69	1.17	1.16	1.19	.04	.04	.03
Meteor	ND	ND									
Physics	147	52	2.82	1.37	2.44	1.05	.85	1.01	.09	.12	.07
Phys Sci	88	71	2.64	1.81	2.27	1.09	1.24	1.17	.12	.15	.09
Division	3519				1.79			1.15			

ND = No Data

The degree of consistency exhibited by several other divisions in their departmental grade dispersions was not displayed for this division. The most outstanding point here was that subgroup deviation values were identical in both Mathematics and Chemistry although approximately one letter grade separated the subgroup means in both departments. Physics was the only department where the deviation value for the "success" category exceeded the "dropout" category. The quite low "dropout" mean probably had a bearing on the limited range of variability. The student either did well in Physics or performed quite poorly. An inspection of the percentage values for the various earned grade distributions in the next chapter will likely substantiate or refute this hypothesis. The overall heterogeneity both within and between the departments was noticeable and suggested the likelihood that classroom performance was independent of any direct effect produced from the dichotomous criteria. Thus, the "successful" students were as variable in their performance as the "dropout" students, at least in Mathematics and Chemistry.

SOCIAL SCIENCE

This particular division produced several surprises when the final tabulations were in. First, the divisional mean g.p.a. was less than for the Physical Sciences and the standard deviation value was the second largest of the eight college divisions. Both History and Psychology carried the majority of the grades and undoubtedly were the major reason for the low divisional total.

The most manifest statistic was the exceedingly low performance by both subgroups in Psychology. Approximately one-third of the 6614 divisional grades were in three Psychology courses, predominately Introductory Psychology, and the departmental mean was only 1.44. Also, the grade variability of the two

Table IX

Mean G.P.A., Standard Deviation and Standard Error of the Mean by Department for "Successful" and "Dropout" Students - Social Science Division

Dept	N		Mean			St Dev			SE Mean		
	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Anthro	94	60	2.44	1.82	2.19	.75	1.07	.90	.08	.14	.07
Educ	85	61	2.45	1.62	2.10	.92	.96	.95	.10	.12	.08
Hist	965	1145	2.33	1.19	1.71	1.06	1.07	1.11	.03	.03	.02
Phil	314	172	2.54	1.44	2.15	1.04	1.16	1.10	.06	.09	.05
Pol Sci	309	307	2.24	1.15	1.69	1.04	1.02	1.07	.06	.06	.04
Psych	799	1253	1.99	1.09	1.44	1.06	1.05	1.09	.04	.03	.02
Soc Sci	43	64	2.52	1.65	2.00	.93	.88	.93	.14	.11	.09
Soc	506	437	2.39	1.53	1.99	.86	1.04	.97	.04	.05	.03
Division	6614			1.72			1.08				

subcategories was identical and thus subject to the same type of interpretation as Mathematics and Chemistry cited earlier. The low performance by students taking courses in this department becomes even more graphically illustrated in the next chapter. Psychology courses are usually intrinsically attractive to the beginning college student but subsequent performance soon convinces him that there are other more desirable majors to pursue. Excluding the non-transfer English Department for reasons already specified the Psychology Department had the dubious honor of having the lowest departmental mean g.p.a. in the entire college. Since there was no available evidence which would suggest that the sample of students taking courses in this department was radically different from the general college population, several alternative explanations, either singly or in combination came to mind, none being too pleasant. First, the course work itself may have been excessively difficult. There is no question that the discipline is becoming more technical, abstract, and specialized. Second, the Y.V.C. students' Vocabulary, Reading Comprehension and Verbal Composite subtest scores on the Washington Pre-College Test were approximately one-half S.D. below the same scores at the 50th percentile for four-year college norms. [1]One could question whether this fact was considered in text-book and related reading selections as well as instructor expectations regarding the students' ability to comprehend the subject matter. Third, the instructor's ability to communicate the obtruse concepts in a simplified manner and maintain the individual's intrinsic motivation may also be suspect. Finally, but not exclusively, the measurement and evaluation practices as they relate

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[1]Rice, Gary A. A Study of the Predictive Validity of the Washington Pre-College Test for Introductory Courses at Yakima Valley College, Y.V.C. Research Project #67-2, February 1968.

to the instructor's course criteria could be reviewed. These implied explanations should not be considered exhaustive of all possible elements influencing student performance but they should be explored before being refuted off hand.

The History Department, while having slightly higher average grades for each category nevertheless is open to some of the same questions posed with Psychology. Their departmental mean value coincides with the divisional mean and there was no difference in the variability of the two subgroups.

The Political Science Department garnered fourth position in number of earned grades within the division. Its pattern of performance, however, almost matched that of Psychology and History; a low departmental mean and no difference between the S.D. values for the two subsamples. Thus, these three departments, Psychology, History and Political Science, constituted 72% of the 6614 grades in the division with mean values of 1.44, 1.71 and 1.69 respectively.

Anthropology took top departmental honors with a 2.19 while Philosophy had the highest value (2.54) for the "success" subgroup.

The Social Science Division attracts many students, especially the "undecided", due to intrinsic appeal in subject matter dealing with people. An examination of the departmental values revéals that the students' reception was neither very social nor hospitable. This is not meant to imply that an automatic revision of grading policy, methods, and standards is in order but certainly some departmental and divisional interaction is proper.

A COMPARISON OF EARNED GRADE DISTRIBUTIONS BY DEPARTMENT AT Y.V.C.

CHAPTER III

Introduction

As a derivative of the computer program which produced the data in the previous chapter, a tally of the number of A, B, C, D, and F, WF, or AWF grades in each department was made. A conversion to percentage figures provided a composite picture of the departmental grading practices on a campus-wide basis. The reader will note that the mean and standard deviation values and corresponding percentage values are directly related since the latter is merely a graphic representation of the former. Again the N values must be considered in each instance.

Before the data can be examined and reflected upon, it is necessary to reiterate the importance of considering the data in relative terms rather than positing any absolute values. The number of complex, interrelated, overt and subtle factors i.e. course content, sequence, difficulty level, prerequisites, student ability and motivation, instructor skill, etc., which congeal to produce any earned grade mitigate against making any grand pronouncements. Also the intent and purpose of the project was not meant to do more than provide a descriptive examination of grading patterns on a broad, superficial level for a rather large and fairly representative sample of "typical" contemporary, full-time Y.V.C. students. These considerations, however, should not serve to negate the findings but only to define the parameters within which implications can be made or inferences drawn. There could and should be many ramifications resulting from a perusal of this entire report in concert with the earlier study which gave rise to this project. Hopefully, as one reviews the figures relative to his specific interests, a series of questions will be raised or tentative explana-

tory hypotheses posed.

Grade Distributions by Division at Y.V.C.

Several points revealed in the original "Dropout" study have a bearing on the subsequent results and thus should be reviewed. (See Tables V, VI and XII in that study) Specifically these tables in respective order referred to the percentage of males and females entering each college division, the high school g.p.a.'s for each sex, and the relationship between high school g.p.a. and college division of initial enrollment. Granting the validity high school grades as indicators of potential performance in higher education, one may conjecture about the likelihood of certain grade distributions on a divisional basis. The speculative percentage distributions would have to be made separately for each division taking into consideration the proportion of the total sample enrolled in each division, the male:female ratio in each division, and high school performance of males vs. females. Projecting a hypothetical set of expected percentages of A, B, C, D, and F for each division based on the above information will produce a reference point for comparison with the obtained divisional values which follow in Table X.

Table X

A Comparison of the Percentage of A, B, C, D and F Grades by Division at Y.V.C.

Division	N	%A	%B	%C	%D	%F
Appl Sci	2152	18.1	35.8	28.9	10.7	5.5
Biol Sci	1706	6.7	26.0	35.8	18.3	12.3
Bus Adm	3395	7.2	21.4	44.6	14.4	11.3
Creat Art	4184	15.6	32.8	35.0	8.6	7.1
Lang & Lit	5836	5.1	19.4	36.8	15.3	22.5
Phy Educ	6634	21.8	35.1	31.1	6.5	4.5
Phy Sci	3519	9.6	19.3	32.2	18.1	19.9
Soc Sci	6614	6.6	17.4	32.9	19.2	22.8

To provide an example of projecting a hypothetical set of values for reference purposes, assume that the various percentage grade categories in Table VII of the original "dropout" study were fairly indicative of overall student performance at Y.V.C. Thus it would be expected that the earned grade distribution for the college would be approximately as follows: A=3%, B=5%, C=36%, D=40%, and F=16%. Very tentatively one could compare the various divisional obtained values in the above table and Figure 1 with these presumed figures. However, the procedure recommended prior to Table X will provide a slightly more valid reference point for each division. It needs to be re-emphasized that the high percentage of F grades for Language and Literature was the result of the non-transfer course grading procedure and should be weighed accordingly. Also, Language and Literature and Physical Science attracted the more able high school students so it would be reasonable to expect a somewhat negatively skewed distribution while positive skewness would be anticipated in Applied Science, Business Administration, Physical Education and possibly Social Science.

The major point of note in Table X was the leptokurtic nature of the distributions for every division. Approximately three-fourths of all grades in each division fell between "B" and "D" with the remaining one-fourth disproportionally distributed at the two extremes depending upon the division. While, in some respect this resembled the percentages in a normal distribution, it could be questioned whether this should be expected, given the knowledge of student high school performance and measured ability. Why should the middle of the divisional grade distribution appear to be normalized while the extremes were definitely nonnormalized? This condition was most pronounced in Physical Science and the Language and Literature Divisions. The rest of the divisions displayed some degree of positive or negative skewness.

The outstanding and most conspicuous feature of this table was the apparent heterogeneity in grading practices between division. Since the data for Table X were derived from a cumulation of the several departments comprising each division, it can be confidently predicted that the inter-divisional and, inferentially, the intra-departmental variability in grading philosophy and methods were equally heterogeneous.

In reading the separate divisional tables in Appendix A to derive the most meaning, it is suggested that one first compare each departmental column value with the divisional totals at the bottom of each table. This should point out any glaring discrepancies. The second step would be to consider the "success" and "dropout" row totals respectively for each department with the division as a whole. One could also combine various grade percentage combinations, i.e., A, B, and C or D and F, for each subsample and department for interdepartmental comparisons. The third consideration should be the "success" column values for each grade category. Likewise for each "dropout" category. Finally, a perusal of the percentage values for each subgroup for each grade category with the departmental totals will be informative. Throughout all of these comparisons, it is mandatory to keep the subgroup N's upon which the obtained percentages were derived in mind. It must be recognized that the N's did not represent number of students but were the number of grades in each department earned by students subsequently classified as either "successful" or "dropout". Thus the interpretation of any subsample percentage value must be tempered by the qualifying statement...

"Of the _____ grades earned by students later defined as successful/dropout, ___ percent of the grades were A, B, C, D, or F in _____ Department."

Finally a reminder that a statistically significant difference $P \geq .01$

existed between all departmental subsamples. Practical Nursing and German were the only exceptions.

Since the data in the previous chapter were actually a function of the respective grade distributions, it would be repetitious and redundant to provide the same department by department analysis. In addition, there were so many ways the data could be coalesced, any attempt at total analysis would only inundate the reader. Therefore, in the interest of brevity and efficiency, the Social Science Division (Table XVIII) will be examined in detail as an example of the way the other tables in Appendix A should be read.

Social Science

As a department, Philosophy had more than twice as many "A" grades (14%) as the divisional total (6.6%). By contrast, Psychology (2.9%) only gave one-half as many "A" grades. The low percentage of B grades given by History, Political Science, and Psychology undoubtedly influenced the divisional total of 17.4%. Four departments, Anthropology, Education, Social Science and Sociology, gave a much higher percentage of "C" grades than the rest of the division. At least four of every ten grades issued to the students in the sample by these departments were "C's" and, in the case of Social Science, one-half were "C's". The "D" and "F" categories also show the influence of History, Political Science and Psychology in determining the divisional totals. One-fifth of all grades earned in these departments plus Philosophy were "D's" while only one grade in ten was "D" in Anthropology and Social Science. Probably the most striking figure on this table was the percentage of "F" grades in the Psychology Department. With better than 2000 earned grades in three Psychology courses (approximately one-third of the entire division)

almost 40% were "F". Even more incriminating were the percentage values for the "success" and "dropout" subsamples. Of the 800 grades in Psychology courses earned by students eventually considered successful by the pre-established criteria, 20% were "F". The most devastating figure occurred in the "dropout" F category where one-half of the 1253 grades were failing. It takes no statistical training to recognize that this percentage is much higher than would have reasonably been expected to occur by chance. The questions raised on this issue in the previous chapter could provide the springboard for further study.

The departmental A, B, and C combined percentages were as follows: Anthropology - 82.6; Education - 76.3; History - 57.6; Philosophy - 69.1; Political Science - 57.2; Psychology - 42.6; Social Science - 78.1; and Sociology - 73.4. Conversely the D-F combinations respectively were 16.6, 23.1, 42.3, 30.2, 42.0, 56.6, 21.1, and 25.9. Rounding numbers during the calculations resulted in a 1% error in the totals. Thus eight of every ten grades in the Anthropology Department sample were "C" or better while only four of every ten grades in Psychology met that criterion. Three-fourths of the earned grades in Education, Social Science and Sociology were average or better while slightly better than one-half of the History and Political Science grades were C, B or A. The remaining D-F percentage combinations predictably showed the reverse trends. Obviously a fairly clear and distinct pattern has been formed regarding inter-departmental grading practices for the sample upon which this study was based and there was little reason to suspect a typical sample from its representative population.

Finally an examination of the subsample values for each grade category disclosed that the "success" percentage values were much larger than the corresponding "dropout" percentages for each department in the "A" and "B" categories; they were approximately equal for the "C's", and the reverse held in the "D"

and "F" categories. This observation is not meant to be any more earth shaking than the sudden awareness that a circle is round. But the trend was certainly distinct and provided a fuller understanding of the reason why a statistically significant difference between the dichotomous subsamples in each department existed. The very fact that the trend was so obvious points out interesting discrepancies. For example, note the percentage of "success" A's and B's vs. "dropout" A's and B's for Anthropology and the higher percentage of "C's" for the "dropout" vs. "success" subgroup for Social Science. Why did these conditions occur?

Hopefully this previous discussion has served a dual purpose. First, to display the method for extracting information from these tables and second, to stimulate the various departments and divisions to begin to inquire about their programs and the methods and techniques of evaluating student performance.

A Graphic View of the Departmental Grade Distributions

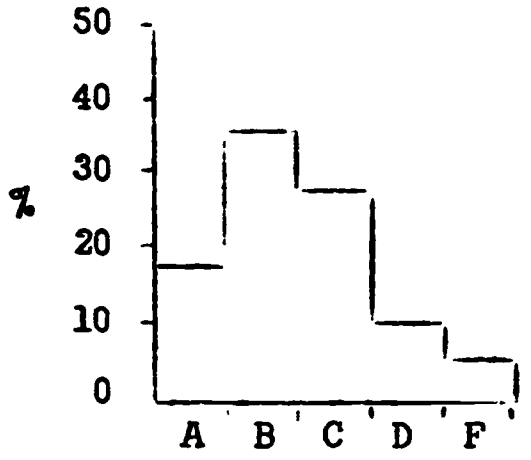
It has been said that one picture is worth a thousand words and many persons are more adept at viewing concepts presented graphically rather than in tabular form. Therefore, in an attempt to attract the reader's attention to a more detailed study of the data in Appendix A and provide a visual overview of the college grading policy, a series of histograms presenting the departmental earned grade distributions by division was prepared. The figures display the various departmental percentage values and the number in parentheses represents the N upon which each graph is based. Because of the necessity of presenting the data in a concise and consolidated manner, the scale values have been condensed. Thus, the bar has been left open-ended for those grade categories

exceeding 50%. Also, the space limitations necessary to present the data in its most readable form dictated that the bar heights represent close approximations of the various percentage values. However, the main point of these figures in the general configuration for comparison purposes and Appendix A provides the more exact obtained values.

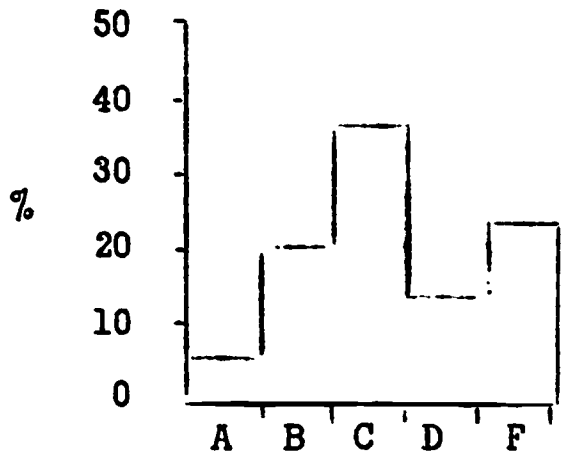
There are several cautions that should be observed in reading these tables. First, the size of N upon which the histograms is based. Second, the percentages as calculated give equal weight to all like grades whether earned in a 1 credit course or a 5 credit course. One can ask if a "B" grade in the former should have equal meaning with a "B" grade earned in the latter. In other words, is a credit hour base more valid than the earned grade regardless of the credit or would a prorated base be more appropriate? Finally, there will be a natural tendency to attempt to identify a single person and/or factor to account for or rationalize any given departmental configuration. The date should not, I repeat, should not be utilized in this manner. The purpose for presenting this data is to stir staff awareness of the existing conditions and it should be up to them to evaluate the significance of the findings. For that reason no attempt will be made to make further comments or value judgments on the figures since they should speak for themselves.

Figure 3
Percentage Grade Distribution by Division at Y.V.C.

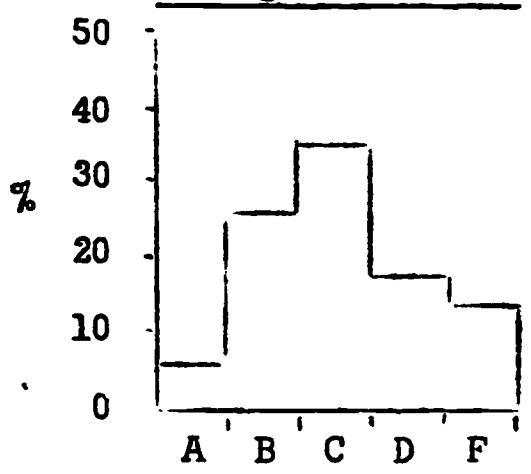
Applied Science (2152)



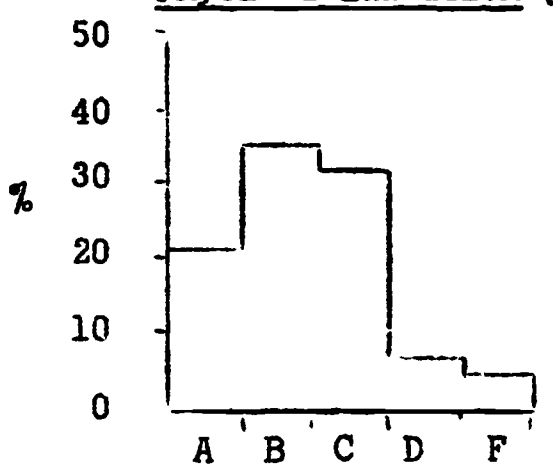
Language & Lit (5836)



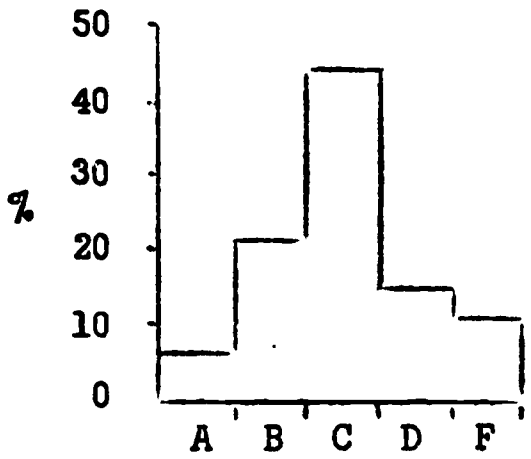
Biological Science (1706)



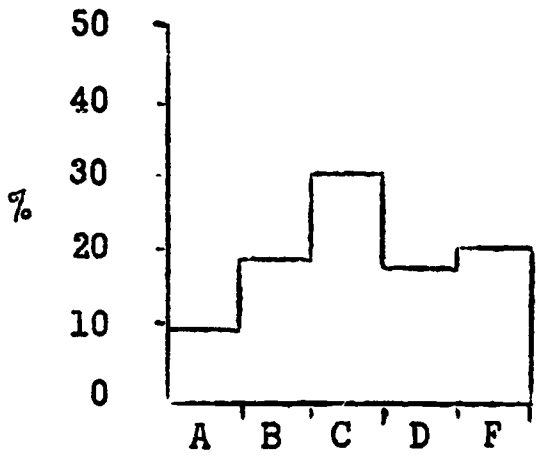
Physical Education (6634)



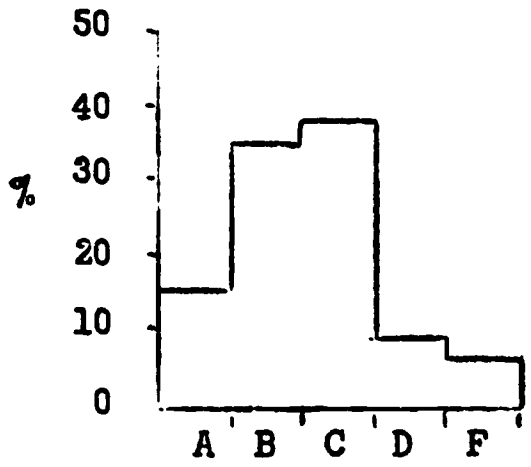
Business Administration (3395)



Physical Science (3519)



Creative Arts (4184)



Social Science (6614)

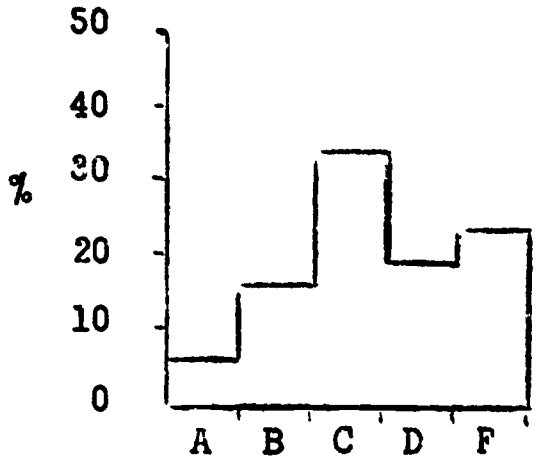
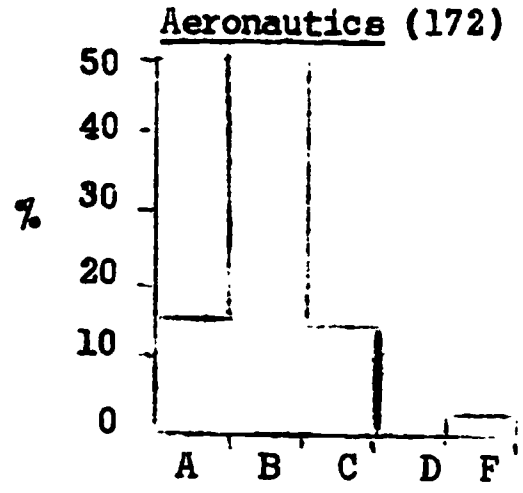
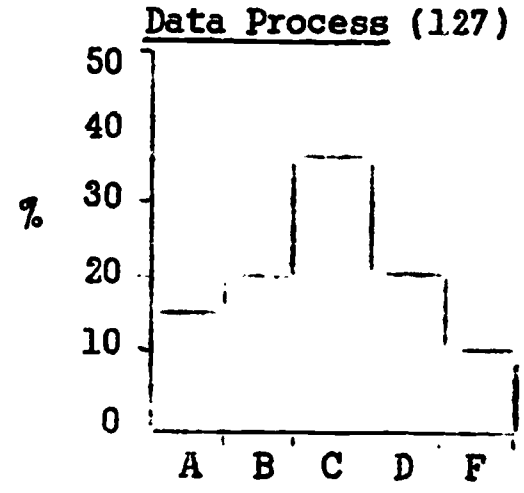
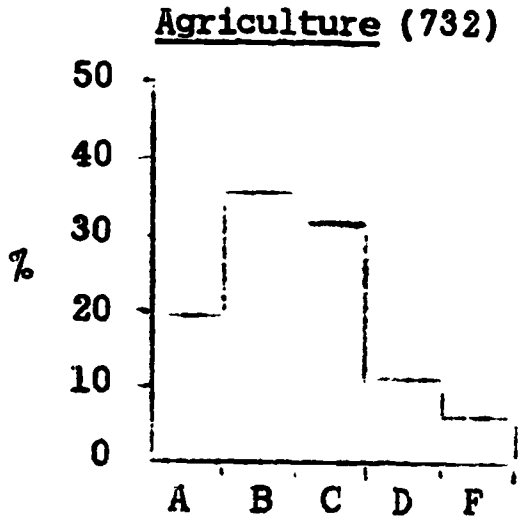
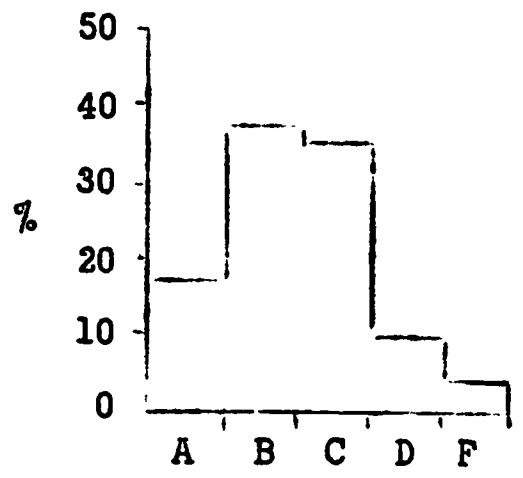


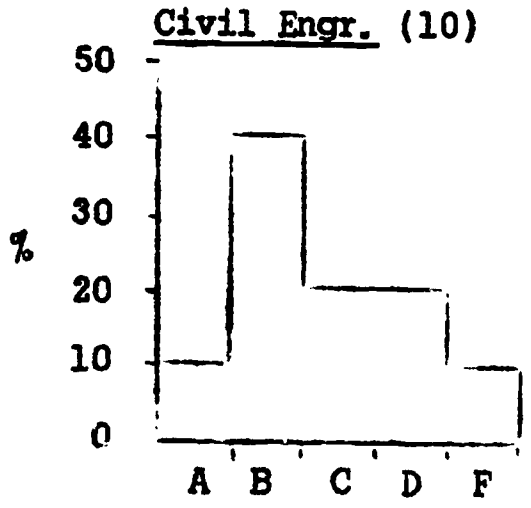
Figure 4
Departmental Grade Distributions - Applied Science

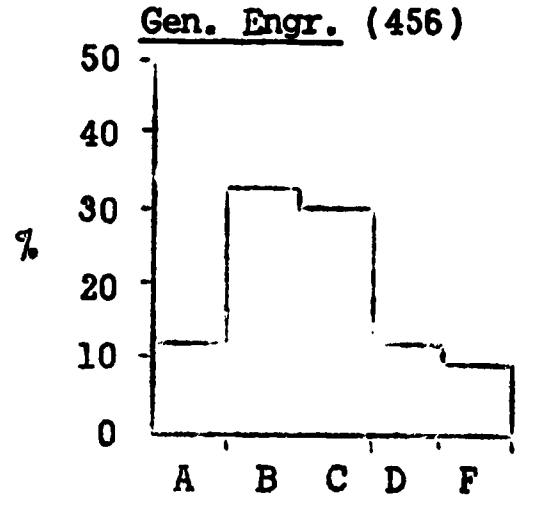


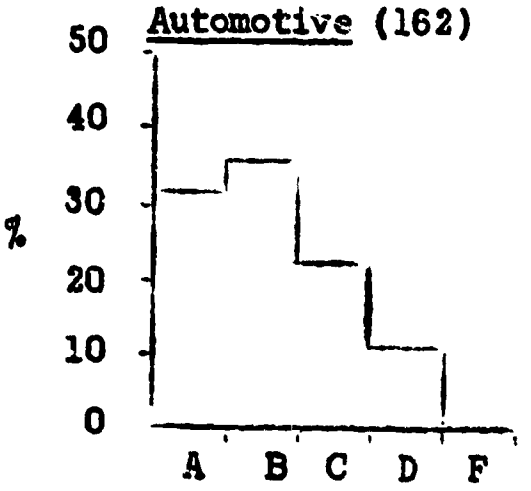












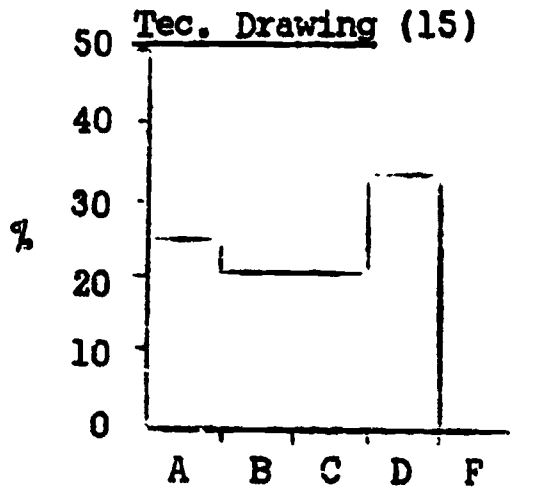


Figure 4 (Continued)
Departmental Grade Distributions - Applied Science

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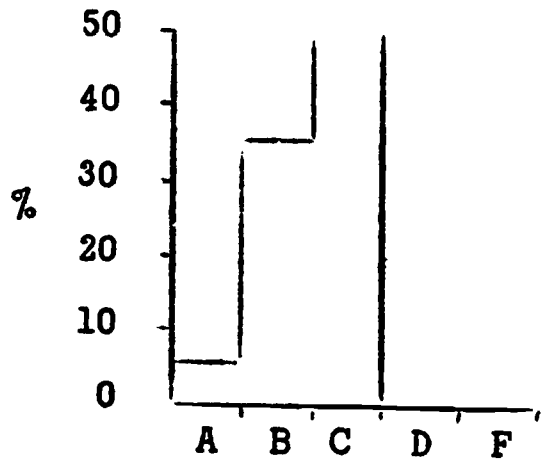

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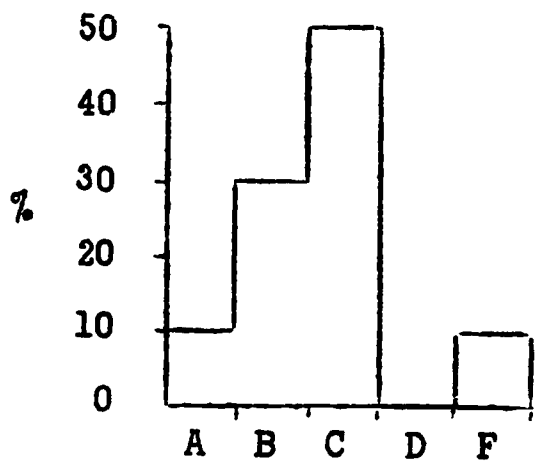

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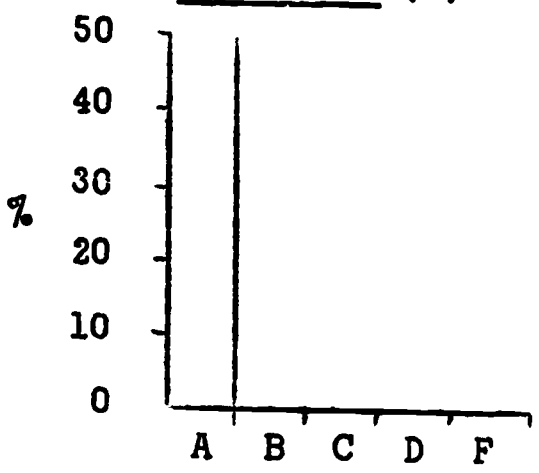

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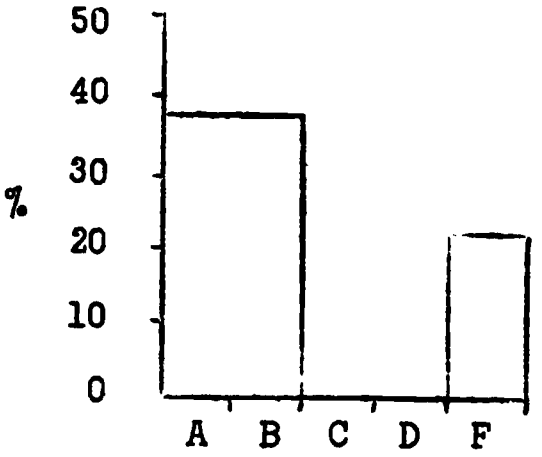

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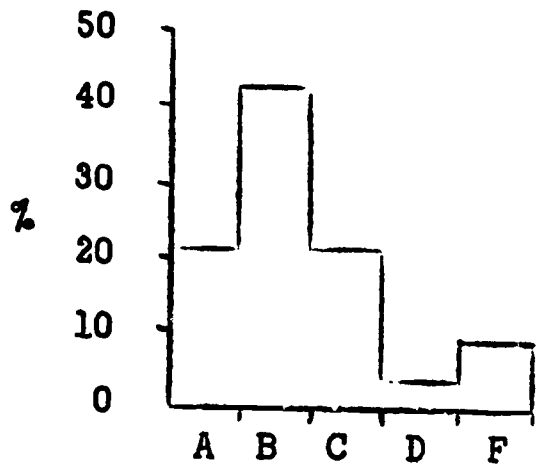

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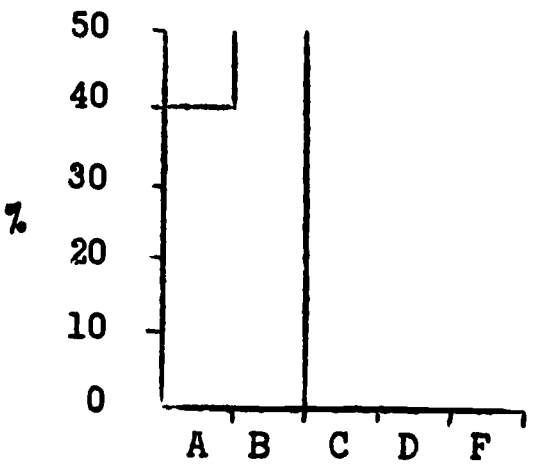
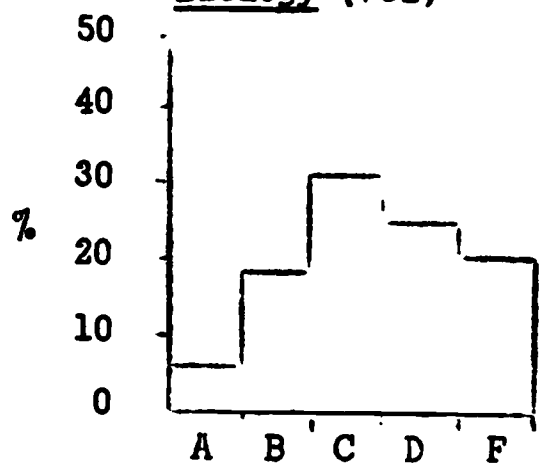
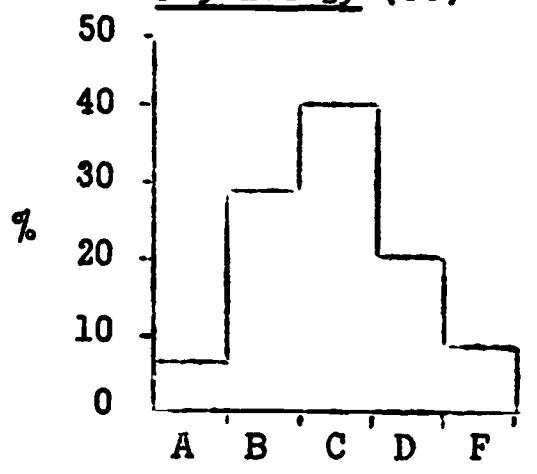


Figure 5
Departmental Grade Distributions - Biological Science

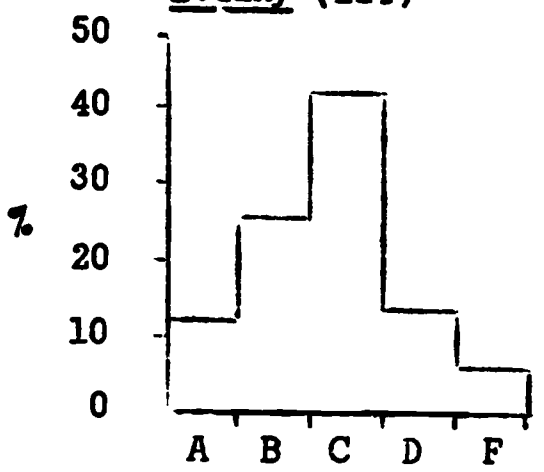
Biology (731)



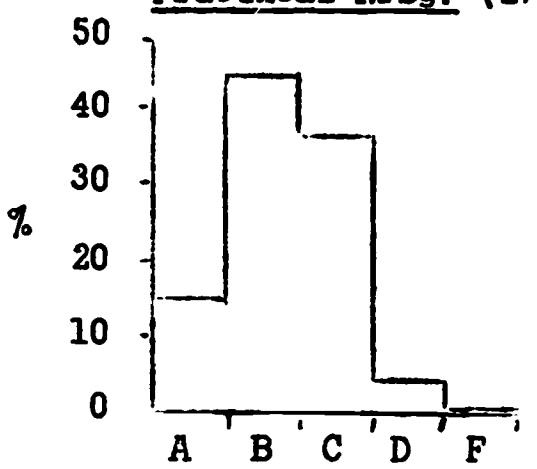
Physiology (88)



Botany (114)



Practical Nrsg. (178)



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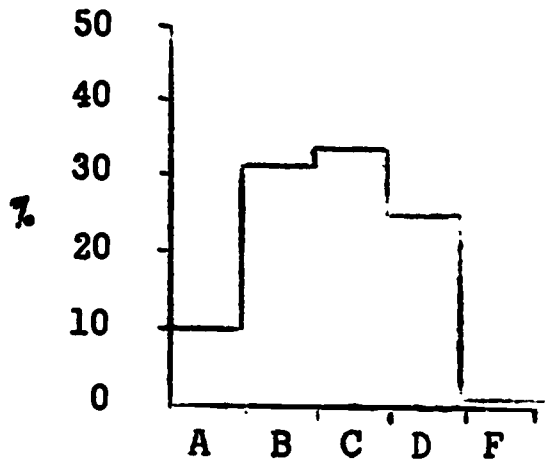

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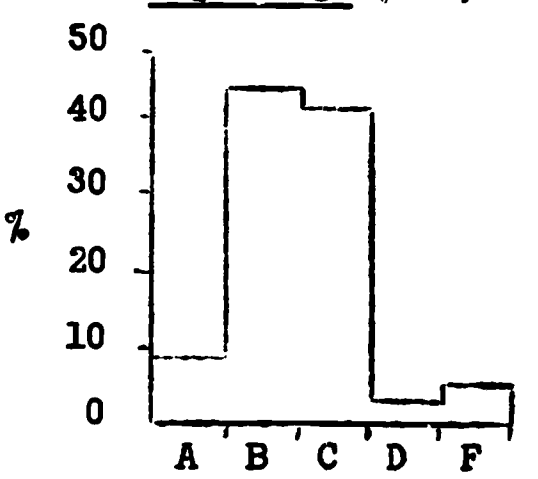
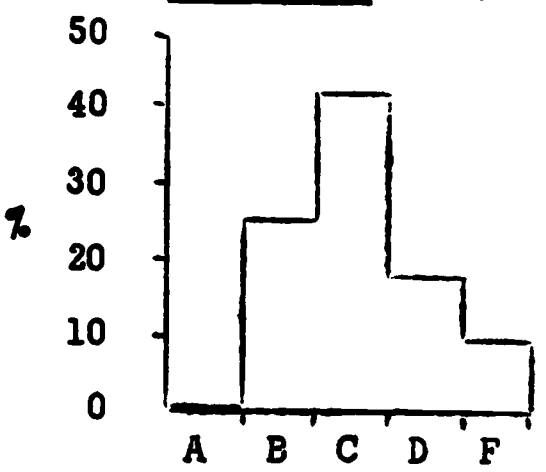


Home Econ. (284)



Zoology (128)

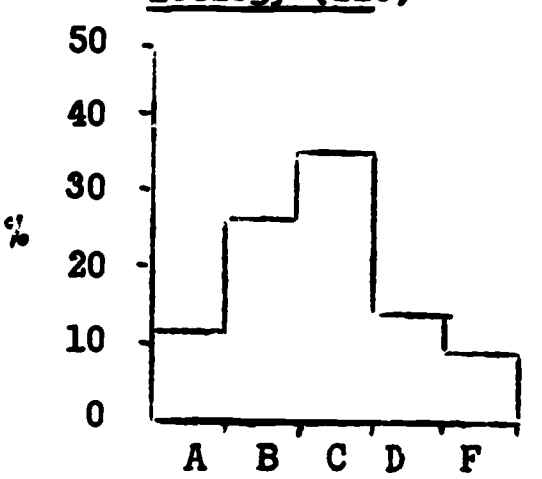
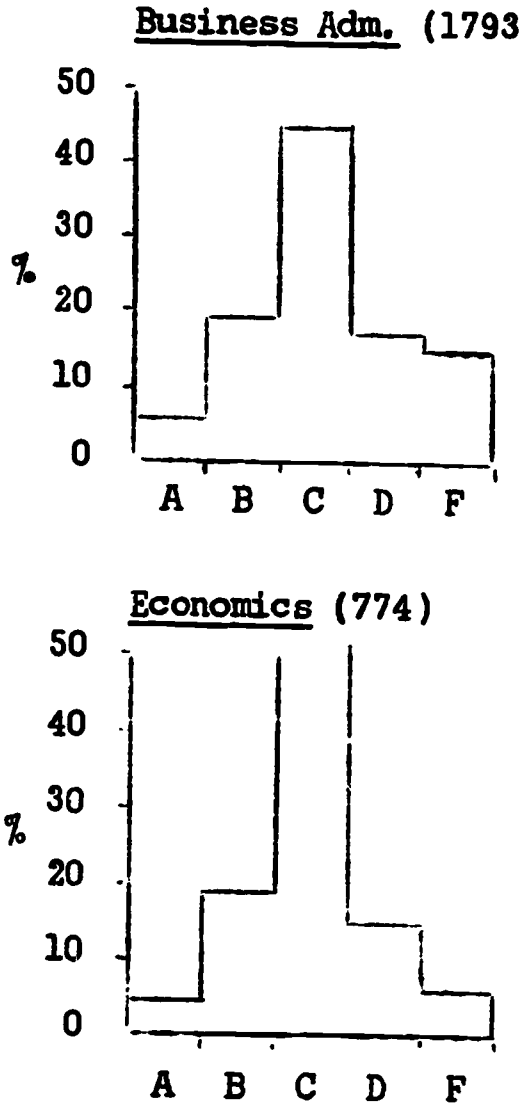


Figure 6
Departmental Grade Distributions - Business Administration



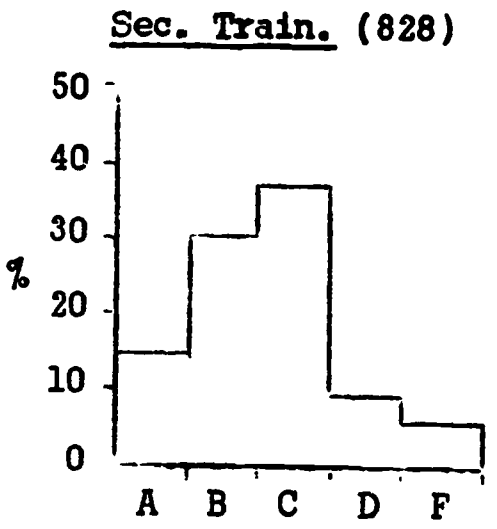
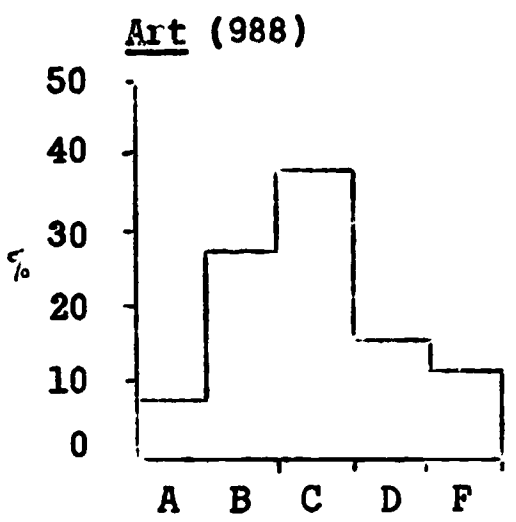
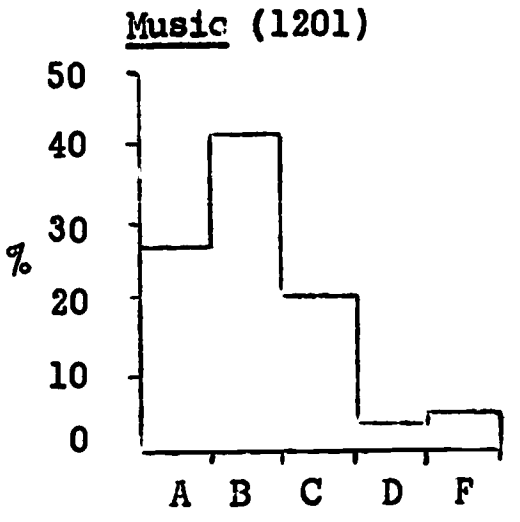
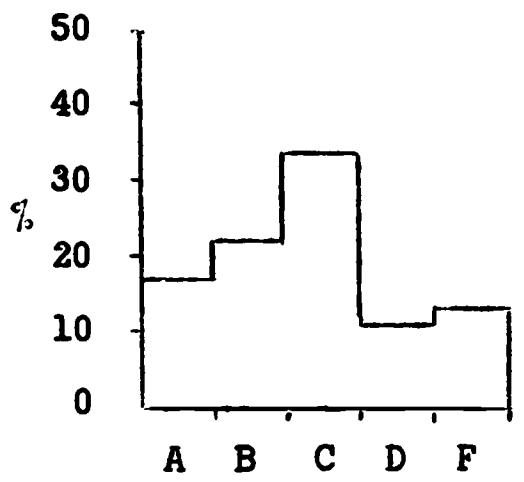
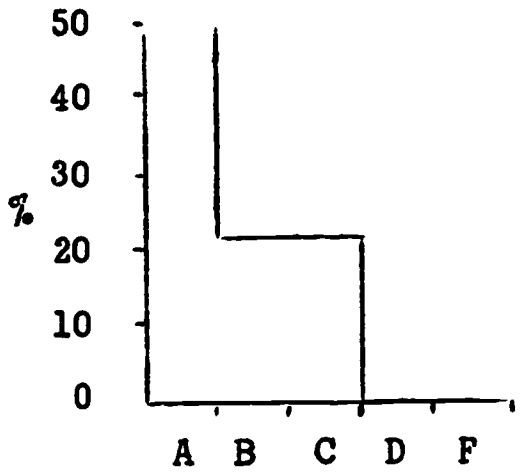


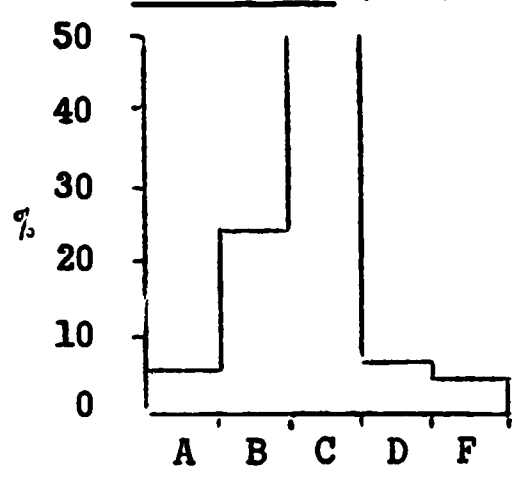
Figure 7
Departmental Grade Distributions - Creative Arts

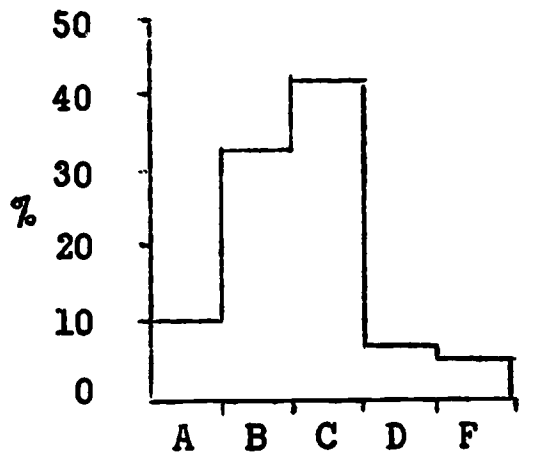












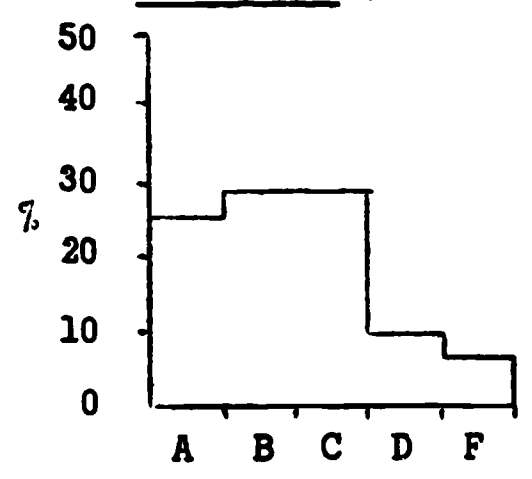
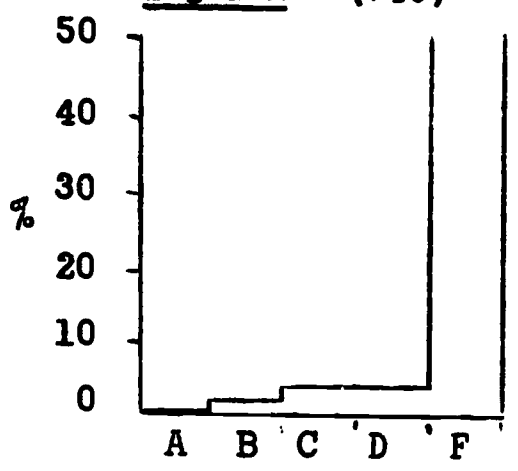
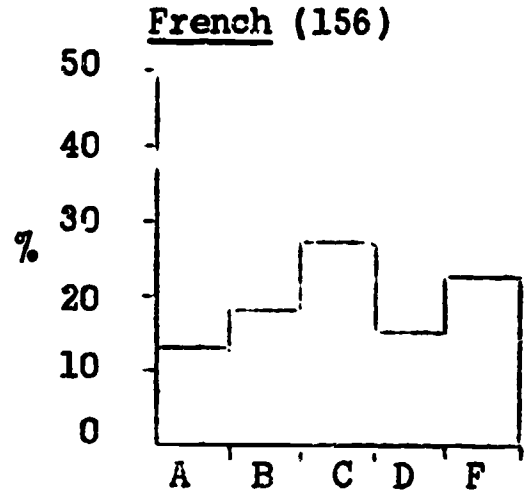


Figure 8
Departmental Grade Distributions - Language & Literature

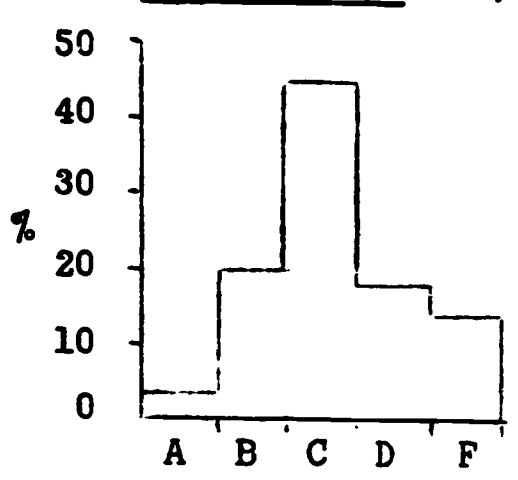
English * (745)



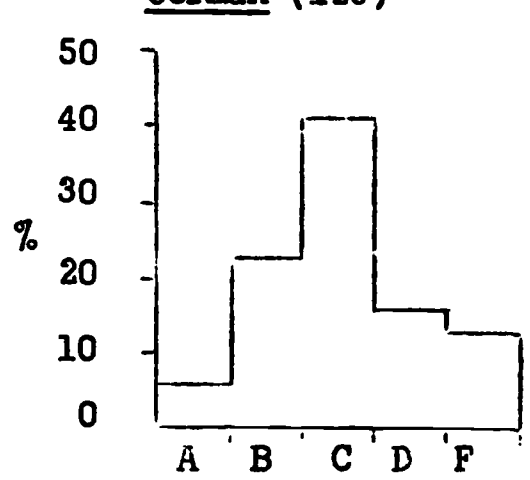
French (156)



English Comp. ** (3929)



German (128)



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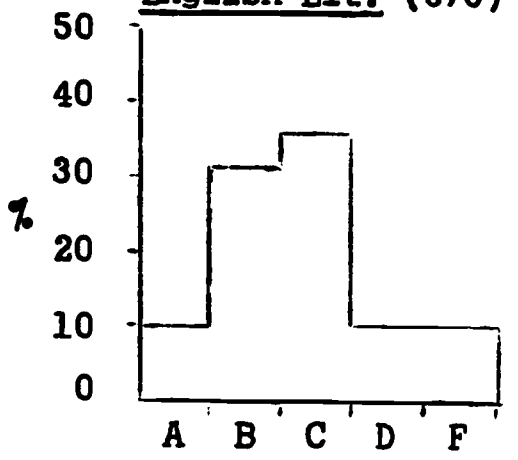
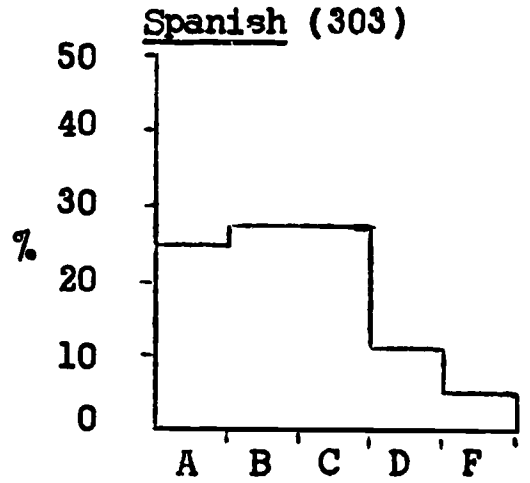
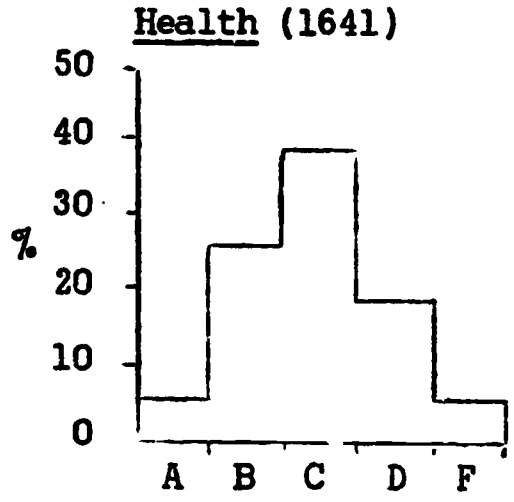


Spanish (303)



* - All Non-Transfer English Courses
** - English 101, 102, 103, 121

Figure 9
Departmental Grade Distributions - Physical Education



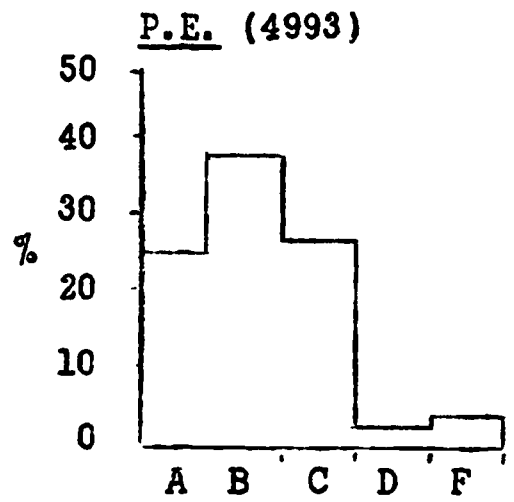
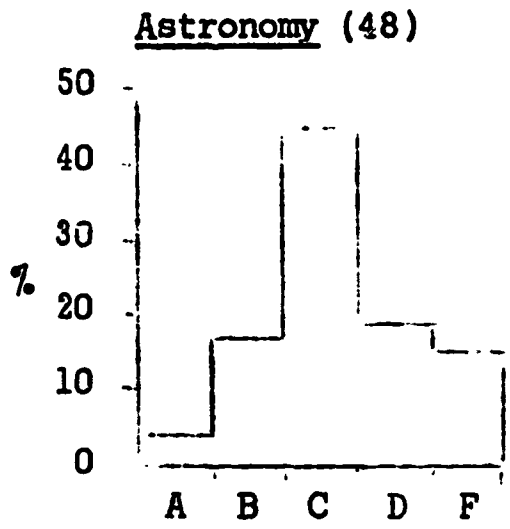
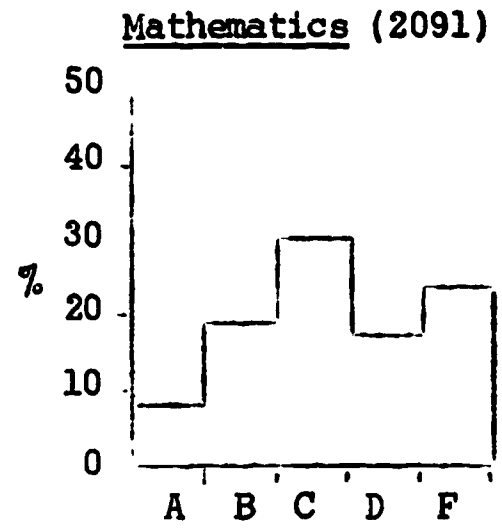
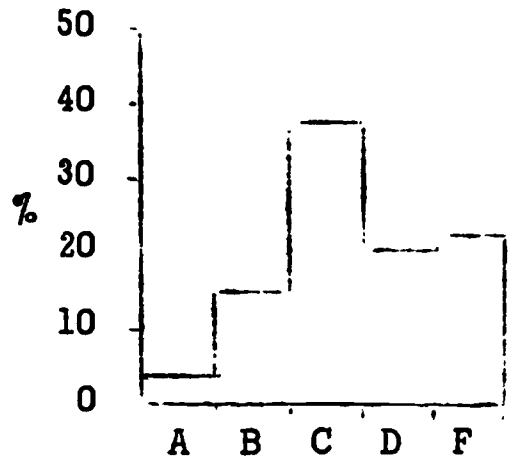
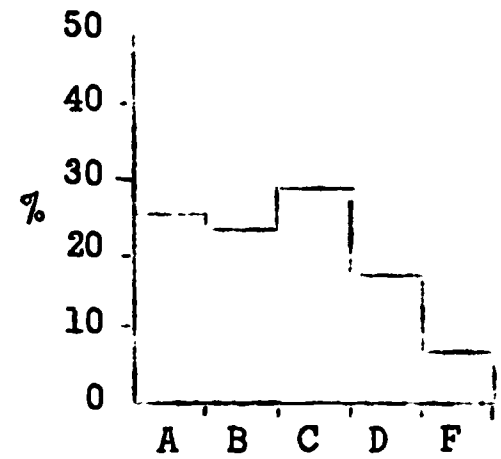


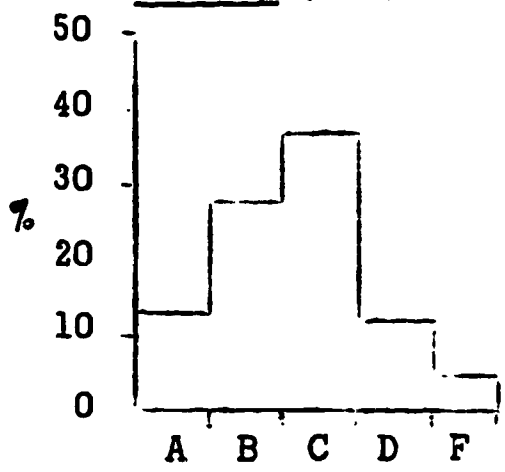
Figure 10
Departmental Grade Distributions - Physical Science











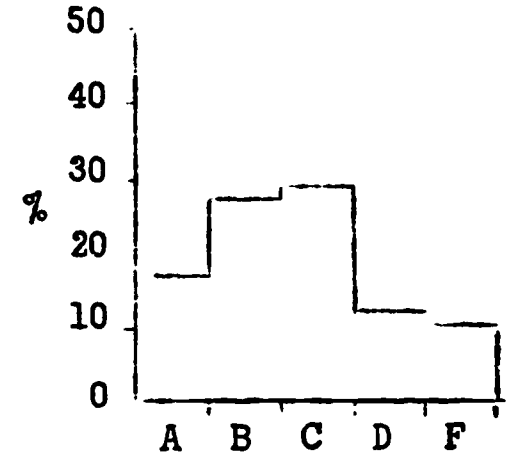
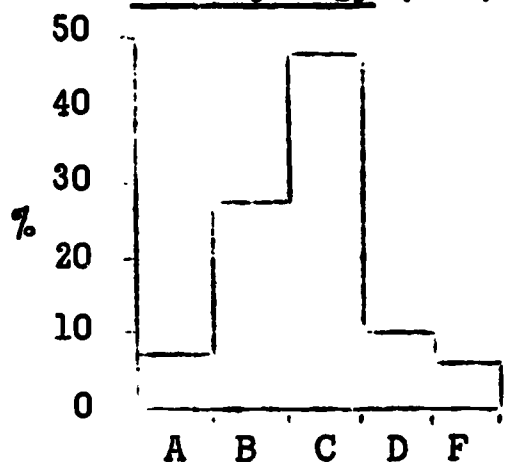
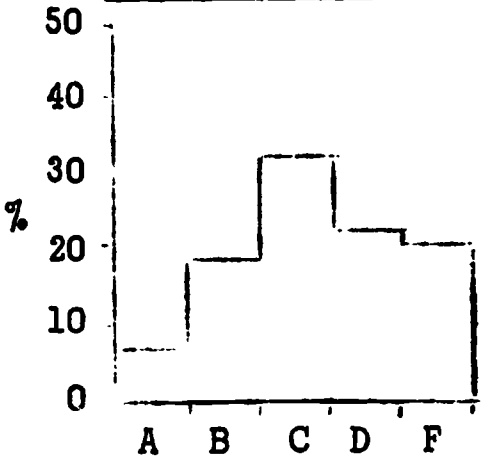


Figure 11
Departmental Grade Distributions - Social Science

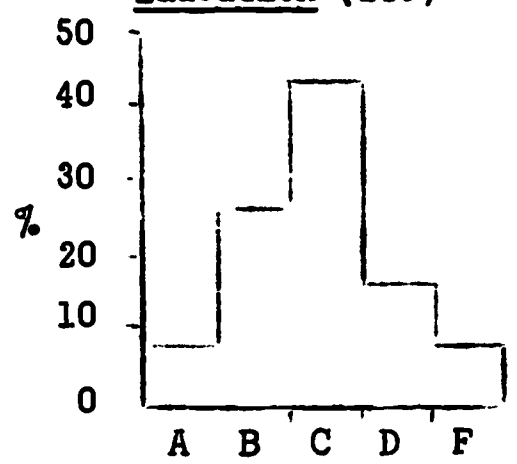
Anthropology (154)



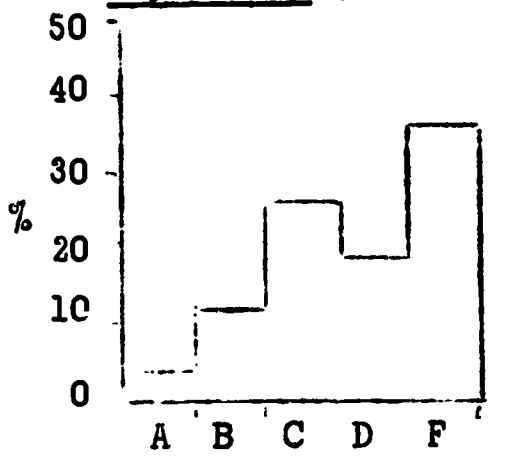
Political Science (616)



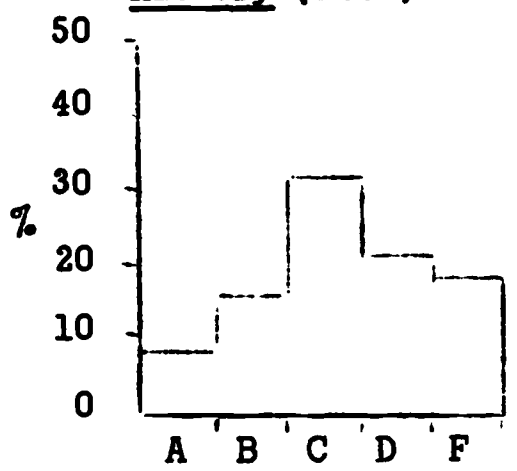
Education (146)



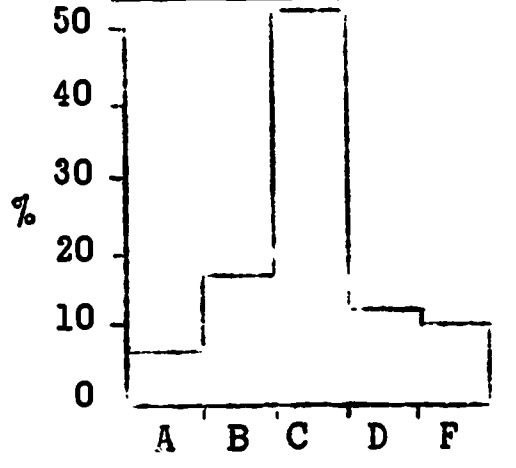
Psychology (2052)



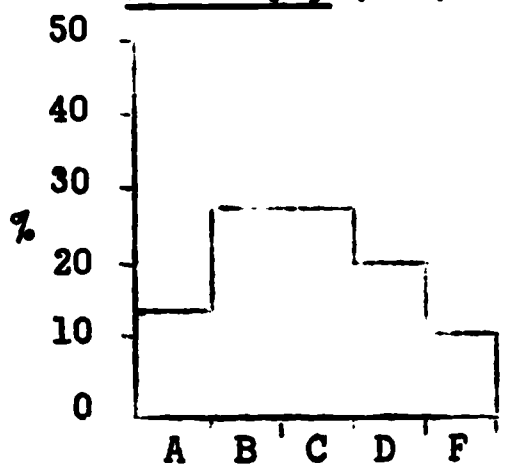
History (2110)



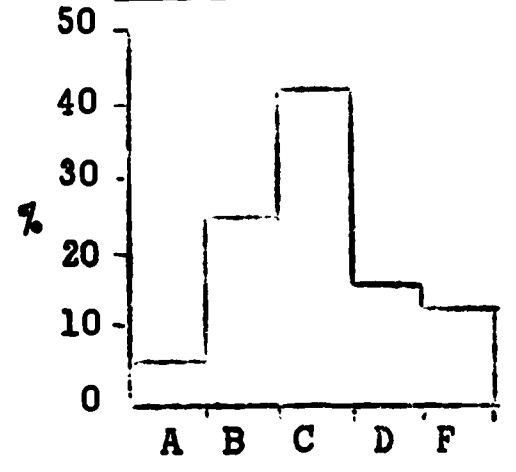
Social Science (107)



Philosophy (486)



Sociology (943)



CHAPTER IV

SUMMARY

An attempt to summarize a project of this nature and purpose will be incomplete at best and woefully inadequate at its worst. Many qualifications and cautions were necessary to glean meaningful and relevant information. If these data limitations were not acknowledged and reviewed with sobriety and in a professional manner the findings will be useless and, quite possibly, deleterious to individuals and/or the entire college.

In terms of the two major hypotheses upon which this study was predicated confirmation was achieved in each instance. First the inter- and intra-divisional variability was quite marked and a series of questions were raised to seek possible explanations. An examination of the individual department profiles as compared to their respective division values revealed great diversity and one must ask whether this incongruity should be expected given the likely make up of the Y.V.C. student population from the earlier studies. Each division had its unique characteristics and, taken as a whole, the conclusion was reached that the community college family was composed of some strange bedfellows.

The second hypothesis generated for this study concerned itself with the existance of any unique and real difference between the "success" and "dropout" subsamples in each department. Statistically it was ascertained that a significant difference of $P \geq .01$ existed between them in every department on campus, excluding Practical Nursing and German. Thus it was established that a real difference existed between the dichotomous criteria but what that difference was cannot be fully identified at this time. This

condition existed in spite of the fact that the original "dropout" study isolated several biographical factors which differentiated between the likelihood of being "successful" in one's stated program on dropping out of school. The corollary hunch regarding the more restricted grade variability of the "successful" students vs. the "dropout" was also demonstrated although individual exceptions were noted in Applied Science, Biological Science, Language and Literature, Physical Science and Social Science.

Grades in those departments which required active performance and motor skills, Applied Science, Creative Arts, Foreign Languages, had consistently higher mean g.p.a.'s than those departments which have a predominantly "theoretical" and factual knowledge curriculum and thus emphasize passive performance. Several possible explanations included the probability of different aptitudes and abilities being assesed and measured, curricula involving prolonged student contact vs. single or two class exposure, and the necessity for more subjectivity in the evaluation of certain areas, vs. more objective measurement in others. Some divisional highlights will now be examined.

The Applied Science Division appeared to be the most heterogeneous. There were more "dropout" than "success" grades in the vocational programs while the converse held for the various two-year terminal programs.

The Biology Department dominated that division and appeared to take its toll as a prerequisite to the courses in other departments. The consistancy of grades within this division could be partly explained by the fact that the same instructor conducted courses in several departments. The Business Administration Department exerted predominant influence on this division and it was noted that the number of "dropout" grades almost doubled the "success" grades for this category. When it was considered that approximately

one-fifth of all entering students initially enrolled in this division the resulting data took on a new perspective.

All seven departments comprising the Creative Arts Division had departmental means exceeding 2.00. The interdepartmental heterogeneity was also quite evident as was the fact that the division included a fairly large and highly specialized staff.

Language and Literature had a spuriously low divisional mean which was produced by a technical error in the non-transfer department computer program. Nevertheless, the division contained a substantial portion of the grades included in the study and student performance was not overwhelming. This, despite the fact that the more able high school students tended to gravitate toward this division and Physical Science initially.

The Physical Education Division, composed of only two departments, took top honors in the college having both the highest divisional mean and lowest standard deviation. Both departments had almost identical measures of dispersion for comparable subsample categories even though a distinct difference existed between the respective mean values.

The "success" N's exceeded the "dropout" N's in every Physical Science Department. The more academically proficient students sought programs in the various physical science disciplines and there was less attenuation in their subsequent performance. Mathematics contained the most earned grades and became the regnant influence.

The Social Science Division, while attracting many students with intrinsic interest in the subject matter, proved to be very antisocial. Psychology,

History, and Political Science served as three of the Four Horsemen of the Apocalypse for the students. However, Psychology would have to be classified as the grim reaper. The overall grading pattern of this division was found to be an almost minor-image of the Physical Science Division. One could speculate on the likelihood of chance factors producing such a condition.

This report makes no claim to be exhaustive or contain sacrosanct truths but it should serve to inculcate provocative ideas and evoke questions about all aspects of the college philosophy, curriculum, and ability to provide meaningful learning experiences for its students based on their identified deficiencies and stated goals. Unless and until some penetrating questions are asked about the community college philosophy in contemporary times and the extent to which that philosophy is being realized, students will continue to react negatively to education. Y.V.C. now has the knowledge and means to take one small step toward reversing that trend.

APPENDIX A

Table XI

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Applied Science Division at Y.V.C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Aero	32	140	21.8	14.2	15.6	56.2	70.6	67.9	15.5	13.5	13.8	0.0	0.0	0.0	6.2	1.3	2.2
Agr	302	430	35.0	7.8	19.0	43.3	26.6	33.4	18.5	37.4	29.6	2.2	19.2	12.1	0.5	8.5	5.1
Auto	125	37	37.5	13.5	32.0	39.9	18.8	35.0	19.1	35.0	22.7	2.3	32.3	9.1	0.7	0.0	0.5
C Engr	10	ND	9.9		9.9	39.9		39.9	19.9		19.9	19.9		19.9	9.9		9.9
D. P.	81	46	22.1	10.7	17.9	25.9	8.6	19.6	35.7	30.3	33.7	16.0	26.0	19.6	0.0	23.8	8.6
Elec	326	65	20.8	1.5	17.5	39.2	15.3	35.2	33.1	38.4	33.9	5.1	30.7	9.3	1.4	13.8	3.4
Gen Engr	253	203	18.5	4.9	12.4	36.3	29.9	33.4	29.5	31.9	30.5	10.6	15.7	12.8	4.7	17.2	10.2
Tec Draw	14	1	21.4	100.0	26.6	21.4	0.0	19.9	21.4	0.0	19.9	35.6	0.0	33.2	0.0	0.0	0.0
V Agr	ND	23		4.3	4.3		34.7	34.7		60.8	60.8		0.0	0.0		0.0	0.0
V Auto	4	2	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
V Educ	11	24	45.4	12.4	22.7	36.3	45.8	42.8	9.0	29.1	22.7	0.0	4.1	2.8	9.0	8.3	8.5
V Elec	2	8	0.0	12.5	10.0	50.0	24.9	29.9	50.0	49.9	49.9	0.0	0.0	0.0	0.0	12.5	10.0
V. H. M.	ND	8		37.4	37.4		37.4	37.4		0.0	0.0		0.0	0.0		24.9	24.9
Weld	ND	5		40.0	40.0		60.0	60.0		0.0	0.0		0.0	0.0		0.0	0.0
Division	2152		18.1			35.8			28.9			10.7			5.5		

ND = No Data

Table XII

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Biological Science Division at Y. V. C.

Dept	No.		% A			% B			% C			% D			% F, WF, AWF		
	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Biol	383	348	8.0	1.1	4.7	27.1	8.5	18.2	37.2	24.0	30.9	20.3	30.1	24.9	7.0	35.8	20.7
Botany	89	25	16.8	0.0	13.1	28.0	11.9	24.4	42.6	36.0	41.1	10.0	32.0	14.8	2.2	19.9	6.0
Forest	17	41	17.6	7.2	10.2	41.1	26.7	30.9	29.3	34.1	32.6	11.7	29.2	24.0	0.0	2.4	1.6
Home Ec	114	170	1.7	0.0	0.6	42.0	17.6	27.3	42.9	42.8	42.8	12.2	22.8	18.5	0.8	16.4	10.1
Physiol	58	30	5.1	3.3	4.4	41.3	3.3	28.3	39.6	39.9	39.7	12.0	36.6	20.3	1.6	16.6	6.7
P Nrsg	98	80	14.2	16.1	15.0	40.7	44.9	42.5	42.8	31.2	37.5	0.9	7.4	3.8	0.9	0.0	0.4
Reg Nrsg	98	22	10.1	4.4	9.0	49.9	18.1	44.0	35.6	68.1	41.5	1.9	0.0	1.5	2.0	9.0	3.2
Zool	110	18	15.4	0.0	13.2	29.9	11.1	27.2	36.2	27.7	35.0	12.7	27.7	14.8	5.4	33.3	9.3
Division	1706		6.7			26.0			35.8			18.3			12.3		

Table XIII

Earned Grade Distributions (Percentages) for
"Successful" and "Dropout" Students by Department
Within the Business Administration Division at Y.V.C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Bus Adm	686	1107	9.5	2.3	5.0	27.7	13.7	19.0	48.6	39.8	43.1	10.6	20.3	16.5	3.1	23.3	15.5
Econ	450	324	5.7	2.4	4.3	27.7	6.4	18.7	55.4	55.8	55.5	8.8	22.8	14.6	1.9	12.3	6.2
Real Est	ND	ND															
Sec Tr	240	588	27.4	9.9	14.9	33.2	28.1	29.5	31.5	40.5	37.8	4.1	12.3	9.9	3.2	8.6	7.0
Division	3395		7.2			21.4			44.6			14.4			11.3		

ND = No Data

Table XIV

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Creative Arts Division at Y.V.C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Art	382	606	13.5	4.4	7.9	41.0	19.0	27.5	37.9	40.0	39.1	5.7	19.9	14.4	1.5	16.3	10.5
Drama	58	92	37.9	6.4	18.5	22.3	23.8	23.2	34.4	34.7	34.5	3.4	15.1	10.5	1.7	19.4	12.5
Human	246	169	7.2	1.1	4.7	36.5	12.9	26.8	49.5	63.2	55.0	4.4	12.9	7.8	1.9	9.4	4.9
Journ	121	102	34.6	14.6	25.4	28.8	29.4	29.0	28.0	30.3	29.0	7.3	12.7	9.7	0.8	12.7	6.2
Music	653	548	34.5	21.6	28.6	46.8	34.0	40.9	14.9	27.1	20.4	2.1	7.0	4.3	1.3	9.8	5.1
Photo	7	2	42.8	100.0	55.5	28.5	0.0	22.1	28.5	0.0	22.1	0.0	0.0	0.0	0.0	0.0	0.0
Radio-T.V.	ND	ND															
Speech	532	606	16.0	5.0	10.4	41.3	25.3	33.2	37.1	44.4	40.7	3.6	12.6	8.1	1.6	12.1	6.9
Division	4184				15.6			32.8			35.0			8.6			7.1

ND = No Data

Table XV

Earned Grade Distributions (Percentages) for
"Successful" and "Dropout" Students by Department
Within the Language & Literature Division at Y.V.C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Engl*	167	578	2.3	0.1	0.5	4.7	0.8	1.6	2.9	2.9	2.9	0.5	3.5	2.8	89.1	92.3	91.5
Engl Comp**	1779	2150	5.3	1.5	3.2	28.2	13.8	20.3	49.6	39.6	44.1	12.5	23.9	18.7	3.8	20.7	13.0
Engl Lit	349	226	16.0	2.5	10.6	38.0	20.3	31.0	36.3	39.3	37.4	6.8	15.4	10.1	2.5	22.0	10.1
French	92	64	20.6	3.0	13.3	24.9	10.8	19.1	28.1	26.5	27.4	14.0	21.8	17.2	11.8	37.4	22.3
German	81	47	7.3	8.4	7.7	27.0	16.9	23.2	46.8	31.8	41.2	12.3	19.1	14.7	6.1	23.3	12.4
Spanish	138	165	42.6	11.4	25.6	29.6	27.2	28.2	21.7	33.8	28.2	5.7	17.5	12.1	0.0	9.6	5.2
Division	5836				5.1			19.4			36.8			15.3			22.5

* All Non-Transfer English Courses
** Engl 101, 102, 103, 121

Table XVI

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Physical Education Division at Y.V.C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Health	643	998	12.2	4.4	7.4	38.0	16.9	25.1	41.1	40.5	40.7	6.6	25.7	18.2	1.6	12.0	7.9
P. E.	2368	2625	31.4	22.3	26.6	41.0	36.4	38.5	25.3	30.5	28.0	0.9	4.4	2.7	0.8	5.9	3.4
Division	6634				21.8			35.1			31.1			6.5			4.5

Table XVII

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Physical Science Division at Y. V. C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Astro	27	21	7.4	0.0	4.1	25.8	4.7	16.5	51.8	38.0	45.7	14.7	23.7	18.6	0.0	33.3	14.5
Chem	452	291	6.1	2.0	4.4	20.0	6.1	14.5	44.4	28.8	38.2	17.6	24.6	20.3	11.4	38.0	21.8
Geol	175	104	19.9	5.7	14.6	36.5	13.4	27.8	34.7	39.3	36.4	6.7	24.0	13.1	1.6	17.2	7.4
Math	1124	967	13.0	4.0	8.8	26.5	10.6	19.1	33.3	26.0	29.9	15.8	21.4	18.3	10.9	37.3	23.1
Meteor	ND	ND															
Physics	147	52	33.3	0.0	24.5	28.5	7.6	23.0	25.1	38.4	28.5	12.2	36.5	18.5	0.6	17.2	4.9
Phys Sci	88	71	26.0	9.7	18.7	30.6	22.4	26.9	30.6	25.2	28.1	6.8	22.4	13.7	5.6	19.6	11.8
Division	3519				9.6			19.3			32.2			18.1			19.9

ND = No Data

Table XVIII

Earned Grade Distributions (Percentages) for "Successful" and "Dropout" Students by Department Within the Social Science Division at Y. V. C.

	No.		% A			% B			% C			% D			% F, WF, AWF		
Dept	Suc	Drop	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept	Suc	Drop	Dept
Anthro	94	60	8.4	4.9	7.0	32.9	21.6	28.4	53.1	38.2	47.2	4.1	19.9	10.2	1.0	14.9	6.4
Educ	85	61	12.9	1.6	8.1	32.9	14.7	25.2	43.5	42.5	43.0	7.0	26.2	15.0	3.5	14.7	8.1
Hist	965	1145	16.0	3.0	8.9	25.1	7.7	15.6	38.8	27.2	32.5	15.1	29.2	22.7	4.6	32.3	19.6
Phil	314	172	19.0	5.1	14.0	35.3	13.9	27.7	28.9	24.9	27.4	13.3	30.7	19.4	3.1	24.9	10.8
Pol Sci	309	307	12.2	1.9	7.0	26.4	7.1	16.7	39.4	27.6	33.5	16.0	29.8	22.8	5.4	33.1	19.2
Psych	799	1253	5.7	1.2	2.9	22.1	6.2	12.3	36.2	21.9	27.4	14.7	20.3	18.1	20.8	49.8	38.5
Soc Sci	43	64	16.2	3.0	8.3	34.8	6.2	17.6	44.1	57.7	52.2	2.2	18.7	12.0	2.2	13.9	9.1
Soc	506	437	8.6	2.2	5.6	35.5	13.2	25.1	44.6	40.6	42.7	8.4	22.3	14.8	2.5	21.1	11.1
Division	6614		6.6			17.4			32.9			19.2			22.8		

A P P E N D I X B

Table XIX

Significance Tests for Mean G.P.A. Differences

Applied Science

Dept	N Suc	N Drop	N Dept	Success & Dropout S.E. Diff of Means	Success & Dropout df	Success & Dropout T°	Dept & Division S.E. Diff of Means	Dept & Division df	Dept & Division T
Aero	32	140	172	.138	170	-2.89			
Agr	302	430	732	.071	730	14.92			
Auto	125	37	162	.174	160	4.95			
C. Engr	10	ND	10						
D. P.	81	46	127	.197	125	4.52			
Elec	326	65	391	.120	389	9.73			
Gen Engr	253	203	456	.103	454	6.05			
Tec Draw	14	1	15						
Voc Agr	ND	23	23						
Voc Auto	4	2	6						
Voc Educ	11	24	35						
Voc Elec	2	8	10						
Voc H. M.	ND	8	8						
Weld	ND	5	5						
Division	1706								

△ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant differences between obtained mean values

Table XX

Significance Tests for Mean G.P.A. Differences

Biological Science

Dept	N Suc	N Drop	N Dept	Success & Dropout △ S.E. Diff of Means	df	T°	Dept & Division S.E. Diff of Means	df	T
Biol	383	348	731	.076	729	13.13			
Botany	89	25	114	.215	112	4.99			
Forest	17	41	58						
Home Ec	114	170	284	.106	282	6.28			
Physiol	58	30	88	.191	86	5.10			
P. Nrsg	98	80	178	.116	176	-1.22*			
Reg. Nrsg	98	22	120	.176	118	2.69			
Zool	110	18	128	.237	126	5.05			

Division 1706

△ T test for two independent samples
* statistically nonsignificant difference between obtained mean values
o two tailed test ≥ .01

Table XXI

Significance Tests for Mean G.P.A. Differences

Business Administration

	N			Success & Dropout ▵ S.E. Diff of Means			Dept & Division S.E. Diff of Means		
Dept	Suc	Drop	Dept		df	T°		df	T
Bus Adm	686	1107	1793	.048	1791	15.81			
Econ	450	324	774	.059	772	10.50			
Real Est	ND	ND							
Sec Tr	240	588	828	.081	826	7.87			

Division 3395

▵ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant difference between obtained mean values

Table XXII

Significance Tests for Mean G.P.A. Differences

Creative Arts

Dept	N Suc	N Drop	N Dept	Success & Dropout △ S.E. Diff of Means	df	T°	Dept & Division S.E. Diff of Means	df	T
Art	382	606	988	.064	986	12.97			
Drama	58	92	150	.182	148	5.53			
Human	246	169	415	.078	413	7.51			
Journ	121	102	223	.141	221	4.33			
Music	653	548	1201	.059	1199	11.23			
Photo	7	2	9						
Radio - T.V.	ND	ND							
Speech	592	606	1198	.053	1196	11.77			

Division 4184

△ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant difference between obtained mean values

Table XXIII

Significance Tests for Mean G.P.A. Differences

Language & Literature

	N			Success & Dropout △			Dept & Division		
Dept	Suc	Drop	Dept	S.E. Diff of Means	df	T°	S.E. Diff of Means	df	T
Engl (Sub 100)	167	578	745	.051	743	3.02			
Engl Comp	1779	2150	3929	.030	3927	22.03			
Engl Lit	349	226	575	.086	573	10.75			
French	92	64	156	.195	154	5.47			
German	81	47	128	.193	126	2.55*			
Spanish	138	165	303	.119	301	7.42			

Division 5836

△ T test for two independent samples
° two tailed test ≥ .01
* statistically nonsignificant difference between obtained mean values

Table XXIV

Significance Tests for Mean G.P.A. Differences

Physical Education

				Success & Dropout △			Dept & Division		
	N			S.E. Diff of Means			S.E. Diff of Means		
Dept	Suc	Drop	Dept		df	T°		df	T
Health	643	998	1641	.048	1639	15.54			
P. E.	2368	2625	4993	.027	4991	13.96			

Division 6634

△ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant difference between obtained mean values

Table XXV

Significance Tests for Mean G.P.A. Differences

Physical Science

	N			Success & Dropout △			Dept & Division		
Dept	Suc	Drop	Dept	S.E. Diff of Means	df	T°	S.E. Diff of Means	df	T
Astro	27	21	48						
Chem	452	291	743	.078	741	10.60			
Geol	175	104	279	.122	277	7.90			
Math	1124	967	2091	.051	2089	18.32			
Meteor	ND	ND							
Physics	147	52	199	.162	197	8.94			
Phy Sci	88	71	159	.185	157	4.47			

Division 3519

△ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant difference between obtained mean values

Table XXVI

Significance Tests for Mean G.P.A. Differences

Social Science

	N			Success & Dropout △			Dept & Division		
Dept	Suc	Drop	Dept	S.E. Diff of Means	df	T°	S.E. Diff of Means	df	T
Anthro	94	60	154	.147	152	4.20			
Educ	85	61	146	.157	144	5.22			
Hist	965	1145	2110	.046	2108	24.40			
Phil	314	172	486	.103	484	10.70			
Pol Sci	309	307	616	.083	614	13.12			
Psych	799	1253	2052	.047	2050	18.91			
Soc Sci	43	64	107	.179	105	4.86			
Soc	506	437	943	.061	941	14.01			

Division 6614

△ T test for two independent samples
o two tailed test, ≥ .01
* statistically nonsignificant difference between obtained mean values