1979 NARST

ANNUAL BOARD MEETING

Atlanta, Georgia

March 21-23

Scheduled Board Meetings

Wednesday, March 21
Cabinet Room, Fourth Floor
7:30 a.m. - 12:00 noon

Friday, March 23
Embassy Room
7:15 a.m. - 9:00 a.m.

Atlanta Hilton

Courtland and Harris Streets, NE

Atlanta, GA 30303

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1979 NARST Annual Meeting
Atlanta, Georgia
Atlanta Hilton Hotel
March 21-23, 1979

PROPOSED AGENDA

1. Approval of Agenda
2. Approval of Minutes of Kansas City Meeting (Nov.-Dec., 1978)
3. Executive Secretary Report
   a. 1978 Financial Report
   b. 1979 Budget and Financial Report
   c. Financial Summary 1976-1979
   d. NARST Membership, Journal Subscriptions, Annual Meeting Attendance
4. Selection of Journal Editor
5. Establish Search Committee for Executive Secretary
6. Committee Reports
7. Old Business
   a. Future Meetings of NARST
   b. Response from Emeritus Members
   c. NARST Costs and Services
   d. NARST By Laws
8. New Business
   a. Support for Marine Education
   b. Date and Place of Fall Board Meeting
   c. Changes in the Standing Committee Structure
   d. Appointment of NARST Research Director to NSTA Research Committee
   e. NARST Position Paper on Purposes
   f. Length of Annual Meetings
9. Approval of Committees and Appointments

Holiday Inn
International Airport
Kansas City, MO 64153
Thursday, Nov. 30, 1978

A regular Fall meeting of the Executive Board of the National Association for Research in Science Teaching was held in the Conference Room of the Holiday Inn. President James Okey presided and called the meeting to order at 7:05 p.m. with the following in attendance:

Voting Members
James Okey, President
John Renner, President Elect
Carl Berger, Board Member
Ann Howe, Board Member
Tony Lawson, Board Member
Arthur White, Research Coordinator

Non-Voting Members
Dave Butts, Journal Editor
Paul Joslin, Executive Secretary

The following were absent:
George Ivany, Board Member
Roger Olstad - Past President
Ron Raven, Board Member
Rita Peterson, Board Member

Approval of Agendum

The President's agendum was accepted without comment.

Approval of Minutes

Motion by Berger, second by Lawson and carried, to approve the minutes of the meetings of the Board of March 31 and April 2, 1978 and the minutes of the Annual Membership Meeting of April 1, 1978.

Executive Secretary's Report

1. Membership Report as of 11/1/78:

Regular	705
Sustaining	7
Patron	2
Life	10
Total	724

New in 1978 82

Membership flow and journal issue mialings are shown in the reports prepared for this meeting.

1978 convention attendance was 201.

2. Financial Summary and Budget Report for 1978 through November 22, 1978 showed:

   -- Expected receipts higher than Budget by $ 237.00

   -- Expected expenses higher than Budget by $ 489.00

   -- Expected cash balance 12/31/78 $ 545.00

   -- Checkbook (cash) balance 11/22/78 $4364.86

3. Audit Report by Virginia Nichols, Assistant Professor of Business Administration, Drake University, indicated that statements, records, and accounts of the Association had been audited for the calendar years 1976 and 1977, and for 1978 through July 31, 1978, and had been found to be in order. The Auditor's statement is a part of the reports prepared for this meeting.

4. The Executive Secretary's proposed budget for 1979 was presented. Action on it was deferred to later in the meeting.

Motion by Berger, second by Renner that the audit of each year's records of the Executive Secretary be hereafter done in January with the auditor's report to be presented to the Spring meetings of the Board and Membership, and that the auditor's report be sent directly to the President. Carried.

Motion by Lawson, second by Renner and carried, that the President prepare a letter to those who do not renew membership to determine, if possible, why membership is dropped with the information received to be used as needed in membership recruitment and retention activities. Carried.

By-laws Revision

Copies of the By-laws as revised were presented to the Board. Amendments approved last year had been added. Proofreading had revealed numerous grammatical, punctuation and stylistic errors, and the Executive Secretary was reluctant to distribute them without appropriate corrections. After examination, Berger moved, Howe seconded, that the By-laws as printed be referred to the Policy Advisory Committee for the purpose of making non-substantive changes with corrected copy to be presented to the Board's Spring meeting. Carried.

Other substantive problems were noted. Renner noted that Part C Section III paragraph 3, requires the President-Elect to assume the presidency if the office is vacated. This would require

one person to handle both program planning and presidential duties which he felt would be unreasonable. Butts suggested dropping Part A Section IV paragraph 2, because it does not conform to present policy, nor is it clear that the editor referred to is editor of the journal only. Renner noted that Part B Section III paragraph 3 states that ex-officio members of the Board have no vote which he believed contrary to Robert's Rules of Order.

After considering these and other potential problems with the By-laws, actions were taken as follows.

Motion by Renner, second by White and carried, to request the Policy Advisory Committee to consider a By-laws change that would move the Past-President to the office of president should a vacancy in the office of president occur.

Motion by Lawson, second by Berger and carried, to request the Policy Advisory Committee to rewrite Section IV of the By-laws to make it clear that the term, editor, refers to the editor of the journal and that other NARST publications are the responsibility of the Publications Advisory Committee.

Motion by Renner, second by Berger and carried, to request the Policy Advisory Committee to consider stating clearly the voting status of ex-officio members of the Board by inserting the term "and non-voting" after the word "Ex-officio" in Part B Section III paragraph one.

Journal Subscription Rate for 1979

Board members were referred to the letter from Allan Wittman, Publisher, Wiley Interscience Journals, stating that journal subscription price for the JRST would be $35.00 for Volume 16 (1979). President Okey explained that an agreement with the publisher and the rules of the U. S. Postal Service require that organizational subscriptions must be contracted at a price at least half of the regular price. He also explained that while it was not clear to all members, total annual dues are in two parts, Association dues, which must be approved by a vote of the members and the annual JRST subscription rate which must be approved annually by the Executive Board.

Motion by White, second by Lawson, to set, for 1979, Annual Dues of $26.50 to include Association dues of $9.00 approved by the membership last Spring and $17.50, as requested by Mr. Wittman, and called for under our present agreement with Wiley Interscience Journals.

Considerable discussion followed with Berger and Joslin taking the position that the Association should absorb a portion of the increase for 1979, and suggesting Annual Dues of $24.25, and White,

Lawson, and others, taking the position that full costs of operating NARST and publishing the journal be forthrightly stated and assumed by all members. Okey pointed out that considering the facts that the regular subscription price is comparable to rates for other similar journals and that we do get it at half-price, it is a genuine bargain.

Motion carried 5-1.

Okey directed the Executive Secretary to include a note of explanation with 1979 dues notices.

Budget For 1979

President Okey asked to delay action on the 1979 Budget until the Board had acted upon other matters that might affect it. This was agreed to.

The meeting was recessed at 10:20 p.m.

Friday, December 1, 1978

The recessed meeting of the Executive Board was reconvened at 8:05 a.m.

Committee Reports

Committee reports were read by all. Motion by Renner, second by Lawson and carried, to receive all reports as submitted and as printed on pages 17-40 of the agendum manual. Actions were then taken as follows:

Policy Advisory - R. Olstad. No actions.

Financial Advisory - R. Peterson

Motion by White, second by Berger and carried, to use the following dates for processing dues notices and budget preparations and approval:

9/15 Executive Secretary sends financial report for first eight months of the year and a proposed budget to the Chair of the Financial Advisory Committee.

10/15 Financial Advisory Committee reports to President and Executive Secretary

11/1 Board Meeting

11/5 Dues notices mailed

12/15 Second dues notices mailed

Publications Advisory - D. Stronck

Motion by Renner, second by Howe and carried, to place ads in the JRST soliciting members from non-member journal subscribers.

Recognition was made that the Committee will report in March on the question, "Should the JRST publish articles describing research in progress?"

Motion by Lawson, second by Berger and carried, to have the journal editor and the president investigate the possibility of cutting "turn around time" and of placing employment ads in the JRST.

1979 Program - J. Renner

Theme will be, "Learning Paradigms." There will be four General Sessions and 38 Individual Sessions. NARST members will be asked to make major presentations at the four general sessions.

Report on proposals:

Category	Submitted	Accepted	Percent
Contributed Papers	104	63	60
Paper Sets	19	11	58
Round Tables	3	1	33
Symposia	2	2	100
Techniques of Research	3	3	100

Research - A. White, Research Coordinator

Committee report was added to agendum manual. President Okey commended Research Coordinator, Art White, for having all publication ventures up-to-date.

White reported some difficulty in liaison with the NSTA Research Committee. He travelled to a called meeting of the Committee but no meeting was held, and he found that no meetings had been held in the previous year. With effort, he was able to get the Committee functioning at a meeting in June 1978.

He requested NARST support for a proposal, (submitted with his report) that the NSTA Research Committee had submitted to the NSTA Board of Directors. At a summer meeting of the NSTA Board this proposal was given the highest priority and $650.00 was authorized for financial support. White requested of the NARST Board $650.00 for two NARST members to attend meetings of the writing team. The resulting plan would be presented to the NARST Board in March.

After discussion of the proposal it was moved by Berger, second by Lawson and carried, to budget $650.00 for the NARST-NSTA proposal and to authorize $430.00 for the first meeting, with the balance to be considered for authorization at the Spring meeting.

Elections - R. Olstad

In addition to the candidates nominated by the Committee, the Executive Secretary had received a validated petition on behalf of Frank E. Crawley of the University of Texas and his name was added to the list of candidates for member of the Board.

Candidates for President-Elect
Stanley L. Helgeson
Richard L. Sagness

Candidates for Board Member
Paul C. Beisenherz
Frank E. Crawley
Jack A. Easley, Jr.
Fred N. Finley
John T. Wilson

JRST Award - D. Riechard

No actions.

Patron Award - J. Wilson

Consideration was given to the letter from member Hugh Munby pointing out a possible need for revision in the criteria.

There was general agreement that the present objectives and procedures were basically satisfactory but that the President should request Wilson and his committee to devise changed procedures that would permit fairer consideration of all papers, especially those with psychological, philosophical and other non-empirical bases, using ideas and suggestions from Munby's letter.

International - G. Ivany

No actions.

Membership - R. Yager

Chair Yager has asked to be replaced. Ron Cleminson of Memphis State has agreed to serve and has been appointed by the President.

Joslin reported that there are 48 Canadian members constituting 6.6% of the membership. Total non-U.S. membership is 82 for 11.3%. He also reported that female membership is 17.7%.

Renner asked for $500.00 from the budget for membership promotion activities. It was agreed to consider this with the budget.

Patron Activities - C. Sipe

Motion by Renner, second by Berger and carried, to direct the President to send letters of thanks to all committee members for their service and to allow the Committee to become inactive.

Placement Services - J. Penick

No actions.

NARST-NSTA Program - J. Renner

Art White agreed to take Renner's place on this committee.

Liaison to AAAS - H. Smith

No actions.

ICASE - D. Lockard

No report - no actions.

JRST Editor Search - R. Raven

The following have applied for the position of Journal Editor for a five-year team beginning January 1, 1980:

Matthew Bruce, Temple
William Brown, Old Dominion
James Barufaldi, Texas
James Shymansky, Iowa

It was agreed to consider the applications at the Spring meeting, and that the applications should be circulated to all Board members well in advance of the meeting, and further that the President would request the selection committee to provide complete information on all candidates and their institutions with recommendations and a rank ordering of applicants.

JRST Editor - D. Butts

Motion by Renner, second by Howe and carried, to approve the Editor's recommendations for one new appointment and two reappointments to the Editorial Board as submitted.

After discussion concerning the functioning of the Editorial Advisory Board, it was moved by Lawson, second by Berger to adopt as policy for the Board the following: "A person may serve on the Editorial Advisory Board for one four-year term, with reappointment possible only after a four-year lapse." Carried.

The President requested the Editor to attempt to spread out more evenly the expiration dates of the terms of those presently serving to avoid having a disproportionate turnover in any given year.

OTHER BUSINESS

NARST and NSTA Area Conventions

President Okey will explore with NSTA the definition of a policy regarding the role of division affiliates (NARST) in planning NSTA Area Conventions.

Archives

Joslin reported for L. Glass, Chr. of the Archives Committee that they had screened and evaluated all past records using the Board-approved guidelines. Retained records will be catalogued and organized. Missing items will be solicited through the Newsletters. He asked whether or not the Archives should include copies of all NARST-edited publications.

Motion by Berger, second by Renner and carried, to include with the Archives at least one copy of all publications produced by NARST (except the JRST) and to purchase copies if necessary.

White agreed to compile a bibliography to be used for this purpose.

Future Meeting Dates

Consideration was given to the policy of meeting with NSTA in odd-numbered years and AERA in even-numbered years, but no action was taken. AERA will apparently meet in Boston in 1980, and the President directed the Executive Secretary to cancel plans to meet in New Orleans and to proceed with plans to meet in Boston.

Executive-Secretary Search

Berger suggested that the President appoint a chairman and to have the committee appointed at the Spring meeting. President Okey agreed to work with President-Elect Renner, and Joslin agreed to revise the call for applicants.

Approval of Emeritus Members

The Executive-Secretary presented applications from each of the following and stated that to the best of his knowledge each was eligible.

Motion by Berger, second by Howe and carried to approve all applicants.

NAME	RETIRED FROM	YEAR	JOINED
Frederic B. Dutton	Michigan State University	1976	1959
Ralph P. Frazier	Southwest Minnesota University	1978	1959
Paul D. Hurd	Stanford University	1971	1932
James R. Irving	STANSI Scientific Fompany	1971	--
Philip G. Johnson	Cornell University	1967	1933
Ralph W. Lefler	Purdue University	1971	± 1950
Ben I. Levine	Cleveland Public Schools	1971	1946
James S. Perlman	San Francisco State University	1977	1951
Ruth L. Roche	California State University-Northridge	1976	1949
Paul A. Wilkinson	Denver Public Schools & University of Denver	1975	1958
Edward Victor	Northwestern University	1978	1962
Nathan S. Washton	Queens College	1979	± 1950
Helen N. Weeks	Wilmington College	1977	± 1970

1979 Budget

The Board worked together on a budget revision based upon previous actions. Motion by Renner, second by White and carried to approve the budget which is attached and made a part of these minutes.

Meeting Expenses

Motion by Lawson, second by Howe and carried to use funds unencumbered because of the inability of R. Olstad, G. Ivany, R. Raven and R. Peterson to attend this meeting to pay the full costs of those Board members attending.

Executive-Secretary Commendation

President Okey asked the Board to acclaim the work of the Executive Secretary, especially for improving the financial status and written records of the Association, and directed that the minutes record this unanimous action.

Inclusions to Minutes

Reports submitted to the Board and included with the agendum manual are a part of these minutes.

The meeting was adjourned at 2:15 p.m.

Respectfully submitted,

Paul H. Joslin
Executive Secretary

Attached: 1979 Budget approved by the Executive Board.

NATIONAL ASSOCIATION FOR
RESEARCH IN SCIENCE TEACHING

January 15, 1979

1978 FINANCIAL REPORT

Savings Accounts

Item	1/1/78	Deposits	Interest	12/31/78
7½% CD Due 12/12/82	$1570.47	None	$117.80*	$1570.47
Passbook	581.46	$117.80*	32.21	731.47
	$2151.93	--	$150.01	$2301.94

Checking Account

RECEIPTS		
Balance in Bank 1/1/78	$ 2,328.41	
From East Lansing Bank	2,815.92	
	$ 5,144.33	$ 5,144.33
DUES		
Regular (722 @$21.49)	$15,516.12	
Patron (2 @$100.00)	200.00	
Sustaining (6 @$40.00)	240.00	
Life (10 @None)	--	
	$15,956.12	$15,956.12
ANNUAL MEETING		
Registrations (201 @$20.00)	$ 4,020.00	
Other	273.00	
	$ 4,293.00	$ 4,293.00
OTHER		
Journal Royalties	$ 1,800.00	
Bank Credits	7.62	
Miscellaneous	158.04	
	$ 1,965.66	$ 1,965.66
TOTAL RECEIPTS		$27,359.11

DISBURSEMENTS

President's Office	$ 37.50	$ 37.50
Executive Board & Program Com.	2,118.89	$ 2,118.89
Executive Secretary's Office		
Annual Meeting Travel	$ 393.92	
Postage	858.06	
Typing Membership Lists	192.93	
Photocopying	150.00	
Phone (Long Distance)	120.00	
Supplies	347.60	
Audit	75.00	
Miscellaneous	64.20	
	$ 2,201.71	$ 2,201.71
Membership Communications		
Abstracts of Presented Papers	$ 1,000.00	
Newsletters	705.53	
Promotions (Brochures, etc.)	541.30	
	$ 2,246.83	$ 2,246.83
Journal and Editors Office		
Printing and Mailing	$10,770.13	
Editorial Board Postage	400.00	
Editors Travel	357.00	
Editorial Board Breakfast	67.27	
Due Journal Publisher for 1977	5,000.00	
	$16,594.40	$16,594.40
Annual Meeting		
Program Evaluation	$ 51.75	
Annual Luncheon	1,265.00	
Program Printing & Mailing	335.48	
Supplies	155.29	
Awards	41.65	
Board Meeting	19.55	
	$ 1,868.72	$ 1,868.72
Other		
ICASE Dues	$ 72.00	
Miscellaneous	89.20	
Bank Debits (Foreign Exchange)	267.88	
	$ 429.08	$ 429.08
TOTAL DISBURSEMENTS	$25,497.13	$25,497.13
BALANCE 12/31/78	$ 1,861.98	$ 1,861.98
	$27,359.11	$27,359.11

NARST
1979 BUDGET
Approved by Executive Board 12/1/78

SAVINGS ACCOUNTS

Account	1/1/79	Interest	Deposits	12/31/79
1. Vaden Miles Trust 72 month 7½% certificate Due 12/12/82	$1570.47	$ 117.80*	None	$ 1570.47
2. Trust Savings 1976 - $70.47 (with certificate) 1977 & 1978-$235.60	$ 235.60	$ 12.75	$117.80*	$ 366.15
3. Passbook Savings	$ 935.71	$ 424.75		$ 1360.46
Totals:	$2741.78	$ 555.30		$ 3297.08

CHECKING ACCOUNT

RECEIPTS			
Balance on Hand	12/31/78		$ 845.00
Dues			
Regular	700	@$26.50	$18,550.00
Sustaining	3	@$60.00	180.00
Patron	3	@$100.00	300.00
Life	10	@None	--
Emeritus	11	@None	--
			$19,030.00
Annual Meeting			
Registrations	200	@$20.00	$ 4,000.00
Other			200.00
			$ 4,200.00
Other			
Journal Royalties			$ 1,600.00
Foreign Exchange Credits			10.00
Miscellaneous			150.00
			$ 1,760.00
TOTAL RECEIPTS			$25,835.00

DISBURSEMENTS

President's Office	
Postage	$ 60.00
Supplies	$ 60.00
	$ 120.00
Executive Board	
Fall Meeting	$ 2,300.00
Spring Meeting	50.00
	$ 2,350.00
Executive Secretary Office	
Postage	$ 1,100.00
Supplies	265.00
Phone	120.00
Photocopying	80.00
Typing	160.00
Travel to Annual Meeting	395.00
	$ 2,120.00
Membership	
Newsletters 5 @$150.00	$ 750.00
Promotions	500.00
	$ 1,250.00
Journal and Editor Office	
Journal Subscriptions 761 @$17.50	$12,530.00
Editorial Board Postage	700.00
Editorial Board Breakfast	50.00
Editor's Travel	370.00
New Editor's Travel	500.00
	$14,150.00
Annual Meeting	
Program Committee Meeting	$ 1,200.00
Program Printing & Mailing	650.00
Abstracts	1,000.00
Luncheon 200 @$8.00	1,600.00
Lectures	--
Awards	50.00
Supplies	35.00
Miscellaneous	100.00
	$ 4,635.00
Research Committee	
Research Project	$ 650.00
	$ 650.00

Other			
Financial Audit		$	50.00
Foreign Exchange Debits			150.00
ICASE Dues			72.00
Miscellaneous			200.00
		$	472.00
Total Expenses			$25,747.00
Balance on Hand	12/31/78	$	88.00
TOTAL DISBURSEMENTS			$25,835.00

NARST

FINANCIAL SUMMARY

January 15, 1979

INCOME

Item	1976	1977	1978	1979 Budget
Balance	$ 223.00	$ 1,165.00	$ 2,328.00	$ 845.00
Dues	16,110.00	15,070.00	15,956.00	19,030.00
Annual Meeting	3,503.00	4.743.00	4,293.00	4,200.00
Royalties	831.00	1,055.00	1,800.00	1,600.00
Miscellaneous	1,796.00[1]	113.00	2,981.00[3]	160.00
TOTAL	$22,463.00	$22,146.00	$27,358.00	$25,835.00

EXPENSES

President's Office	$ 230.00	$ --	$ 38.00[4]	$ 120.00
Executive Board	1,640.00	1,512.00	2,119.00	2,350.00
Secretary's Office	1,422.00	1,992.00	2,202.00[5]	2,120.00
Membership	700.00	935.00	2,247.00	1,250.00
Journal	10,617.00	8,298.00	16,594.00[6]	14,150.00
Annual Meeting	4,475.00	6,753.00	1,868.00	4,635.00
Research	--	--	--	650.00
Miscellaneous	2,214.00[2]	328.00	429.00	472.00
Balance	1,165.00	2,328.00	1,861.00	88.00
	$22,463.00	$22,146.00	$27,358.00	$25,835.00
SAVINGS	$ 2,009.00	$ 2,151.00	$ 2,301.00	$ 3,118.00

NOTES:

1. Includes V. Miles Estate Bequest $ 1,500.00
2. Includes transfer to savings 1,830.00
3. Old Account in East Lansing Bank 2,815.92
4. Includes Program Committee Meeting formerly charged to Annual Meeting 847.63
5. Includes Abstracts formerly charged to Annual Meeting 1,000.00
6. Includes Amount Owed For 1977 5,000.00

MEMBERSHIP REPORT

February 1, 1979

NARST MEMBERSHIP FLOW

Years	Dates				
	March	May	October	December	New
1973		539	788	810	
1974		592	757	773	
1975			626	635	
1976	523		713	761	
1977	367	608	620	710	66
1978	543	669	715	724	82

MEMBERS AS OF DECEMBER 31, 1978

Regular	705
Sustaining	7
Patron	2
Life	10
Total:	724

MAILING LABELS TO JOURNAL PUBLISHER

	Issue Number					
Year	1	2	3	4	5	6
1977	752	752	NA	NA	NA	(814)
1978	781	610	669	669	715	715
1979*	231	460				

*Gracing Discontinued and Issue Mailing Dates Advanced

ATTENDANCE AT ANNUAL MEETING

Year	City	With	Attendance
1976	San Francisco	AERA	162
1977	Cincinnati	NSTA	251
1978	Toronto	AERA	201

CALL FOR APPLICANTS FOR THE

POSITION OF EDITOR OF

THE JOURNAL OF RESEARCH IN SCIENCE TEACHING

The editor of the Journal of Research in Science Teaching is appointed by the NARST Board and serves for 5 years. David Butts will finish his term as editor on December 31, 1979. A new editor will be announced at the 1979 Annual Meeting in Atlanta. The person selected will then have several months to become familiar with the operation of the journal and become the new editor on January 1, 1980.

Duties: The JRST editor is responsible for coordinating the review of all manuscripts submitted for publication. This involves correspondence with authors, with the editorial review board of the journal, and the publisher. The JRST editor is an ex-officio member of the NARST Board and attends all board meetings to report on the operation of the journal.

Term: Five year term beginning January 1, 1980. The editor will be selected by May 1979 to allow a smooth transition from the present operation.

Nature of Applications: The person selected as editor must negotiate 1/3 released time from his or her institution for the period January 1, 1980--December 31, 1984. A 1/2 time secretary for this period is also needed. Costs of duplicating manuscripts are provided by the institution (approximately $1000/year). NARST provides the editor with travel expenses for attending the 2 board meetings each year and $600/year for postage. The publisher of the journal provides the editor with review forms, mailing labels, and stationary. A letter of support from a dean and/or vice-president must accompany the application and state the willingness of the institution to provide a 1/2 time secretary, $1000 per year for duplicating, and 1/3 released time for the editor.

Procedure: Applicants will be screened by the committee named below and forwarded to the NARST Executive Board.

Committee: Ronald J. Raven, SUNY at Buffalo
Carl F. Berger, University of Michigan
Stanley L. Helgeson, Ohio State University
Wayne W. Welch, University of Minnesota

Deadline: Send applications to Ron Raven (who is chairing the search committee) at this address by *November 20, 1978.*

Ronald J. Raven
Faculty of Educational Studies
State University of New Your at Buffalo
Amherst, New York 14260

approved

Search Committee for
Exec Secy

Jack Renner - ex officio
Rita Peterson - Chair

Anne Horne
~~Tony Lacasa~~
Ed Smith
Bob Stevens
Will Jacobson
Gary Bates
Mike Abraham
Bill Holiday
Ron Anderson

3 to be selected from list

Search Committee will construct a position description & requirements & circulate to Exec Bd by June 1.

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CALL FOR APPLICANTS FOR THE

POSITION OF

EXECUTIVE SECRETARY OF NARST

By action of the membership, the position of Executive Secretary of NARST has been created. This is a call for applications for the position.

It is the hope of the Executive Board that many members will be interested in this leadership role. Certainly an Excutive Secretary is a critical appointment in terms of the Association. Now is the time to volunteer, to recommend, and to prepare firm proposals concerning the newly established office.

Duties: The Executive Secretary will be responsible for planning the budget, receiving and dispersing the funds of the organization, coordinating plans for the Annual Meeting, handling correspondence, keeping the current records and archives, editing the Newsletter, and working closely with the officers and committees of the organization.

Term: Five year term beginning January 1, 1976. This allows a four month overlap with the current Secretary-Treasurer to insure a smooth transition.

Nature of Applications: It is hoped that the Executive Secretary will be able to negotiate released time (at least one-fourth time) from his or her institution. In addition, it is hoped that the institution will provide office space and equipment, utilities, phone service, computer time, and part-time secretarial service. Occassional access to a small secretarial pool may be necessary to handle the work at peak times. Applications should clearly state the type of released time and services they and their institutions are willing to commit.

Procedure: Applications will be screened by the committee named below and recommendations will be forwarded to the NARST Executive Board for consideration at the November meeting.

Committee: Joe Novak, Cornell University
James Okey, Indiana University
Wayne Welch, University of Minnesota

Deadline: Send applications to this address by July 15.

James R. Okey
School of Education
Indiana University
Bloomington, Indiana 47401

* * * * * * * * * * * * * * * * * * * *

TO: NARST Board DATE: _____

REPORT: Policy Advisory Committee

FROM: Roger G. Olstad Business Phone: (206) 543-1847

Committee Members: (if appropriate)
Richard L. Sagness
Jane Bowyer
John W. Renner (Ex-Officio)

Report for the Board:

TO: NARST Board DATE: _____

REPORT: Financial Advisory Committee

FROM: Rita W. Peterson Business Phone: _____

Committee Members: Glen S. Aikenhead
(if appropriate)
Kenneth George
Wayne W. Welch

Report for the Board:

Charge to Pub Adv Com

1

TO: NARST Board DATE: Feb. 21, 1979

REPORT: Publications Advisory Committee

FROM: David R. Stronck, Chairperson
University of Victoria, B. C. V8W 2Y2
Canada
Business Phone: (604) 477-6911 local 4454

Committee Members: (if appropriate)
Marjorie Muehlke, University of Pittsburgh
Vincent N. Lunetta, University of Iowa
Ann C. Howe, Syracuse University
David P. Butts, University of Georgia (Ex-Officio)

Report for the Board:

The Publications Advisory Committee reported on November 2, 1978, no objection against the placing of an ad in the Journal soliciting members. The Committee fully supports the carried motion of November 30, 1978, by which the NARST Executive Board approved placing ads in the Journal soliciting members from non-member journal subscribers.

The Committee opposes the publication of articles describing research in progress in the Journal. However, "findings" from on-going research projects as they occur may be appropriately presented in the Journal. In general, the Committee recommends a tightening up rather than a lossening of the requirements for publication. But these requirments should not discriminate against non-conventional research that may provide new systems for research study in science education.

The Committee favors the publication of brief statements about research in progress in the newsletter. David P. Butts, Editor of the Journal, noted that the Journal has a much larger audience than the Newsletter. Nevertheless, the Committee assumes that the Newsletter has sufficient audience and the more appropriate audience.

The Chair wishes to thank the members of the committee for their cooperation and help. Two members of the Committee are at the end of their term: 1. Marjorie Muehlke, who has spent the current year at the University College, Botswana, and 2. David P. Butts, ex-officio member as the Editor of the Journal. The Committee wishes to express its deepest gratitude to David P. Butts for his extraodrinary, generous, and excellent leadership as the Editor. He has certainly done superb work in this time-consuming and difficult job. The Journal is certainly excellent and merits the highest recognition.

TO: NARST Board DATE: _____

REPORT: Program Committee

FROM: J. Renner Business Phone: (405) 325-5723

Committee Members: (if appropriate) Pat Blosser, Bill Capie, Bill Holliday, Jim Shymansky, and Art White

Report for the Board:

TO: NARST Board DATE: February 20, 1979

REPORT: Research Committee

FROM: Art White Business Phone: 614-422-4121

Committee Members: (if appropriate)
Claudia Douglas
Gary Bates
Russell Yeany

Report for the Board:

The research committee activities:

A. Program planning for Annual Meeting in Atlanta, 1979.

B. Author and topic selection for annual and topic research reviews.

C. Collection, organizing and editing of abstracts for Annual Meeting in Atlanta, 1979.

D. Progress report on NARST-NSTA cooperative research efforts.

E. Science Education instruments clearinghouse activities.

F. Communication of NARST, NSTA and federal, state and local policy making and funding agencies.

Research Concerns of
Secondary Science Teachers

Research on effectiveness of individualized learning activities in science classes.

Effects of individualized learning verses group pacing

Effects of total contract courses verses lecture and exams

How to manage individualized laboratory programs

Research on the effects of teaching science in the interdisciplinary dimension as it relates to areas such as mathematics, social studies, and reading.

The relationship between using calculators in science class and an improvement in mathematical ability

Relationship between math skills and science achievement

Improving reading and language skills while teaching science

The most effective methods to approach social issues in science

Research on the effectiveness of laboratory experiences in the science classroom.

The effect of traditional lab experiences verses those involving inquiry

Detailed look at benefits of laboratory science

Use of safe practices in a laboratory experience

Research on motivational techniques that relate to learning and continue involvement in science

Research related to promising practices in teaching science to reluctant learners

Techniques which generate enthusiasm in all students

Ways of encouraging more students to take upper level courses

Research on the effectiveness of supplementary science experiences (e.g., projects clubs).

Effects of student science projects on learning scientific principles and application of scientific methods to everyday situations

Effectiveness of clubs and science fairs in teaching science

Assisting students with the methods and procedures of project work

Research on and development of valid and reliable science testing and grading procedures.

Pass - fail verses A - F grades

Development of reliable evaluative instruments to measure effectiveness of science instruction (content and process)

Effects of evaluation (grading) on student learning

Research on the selection and sequencing of science content in the curriculum.

Knowledge verses process: finding a balance in science instruction

Effectiveness of sequencing of science courses (e.g., biology, chemistry, physics)

Effectiveness of various science programs such as unified science

Research on the influence of science classroom experiences on cognitive achievement.

How teaching strategies affect student achievement

Which teaching methods work best for certain basic concepts? Lecture, lab, inquiry, rote, LAPS, etc.

Research related to productivity of various patterns of interaction between teachers and students

Research on the relationship of student cognitive development and learning styles to science curriculum development and teaching.

- Matching students' cognitive development to the teaching methods
- Learning styles of students and related effective teaching strategies
- Ways to identify the learning needs of students

Research on the influence of teacher characteristics on pupil learning and attitudes

- How the teacher's personality affects classroom learning
- Correlation between teachers' attitudes toward science and students' attitudes

TO: NARST Board DATE: _____

REPORT: Election Committee

FROM: Roger G. Olstad Business Phone: (206) 543-1847

Committee Members: (if appropriate) Richard J. Rezba

James J. Gallagher

Report for the Board:

TO: NARST Board DATE: February 28, 1979

REPORT: JRST Award Committee

FROM: Donald E. Riechard, Chairman Business Phone: (404) 329-6468

Committee Members: (if appropriate) Robert Bridgham, Richard Campbell, Eugene Chiappetta, Harold Jaus, James Neujahr, and John Smith

Report for the Board:

The JRST Award Committee has worked diligently to complete its task. After tabulating results of evaluations of the six issues of volume 15, there was no clear winner. Five of the articles were quite close in the ratings. Thus, a first round run-off was held in which two articles substantially outscored the others. The two, however, received nearly the same ratings. Therefore, the Committee is now in its second round run-off between the following articles:

Issues	Authors	Titles
* 4	Johnson and Howe	The Use of Cognitive Conflict...
6	Long, Okey, and Yeany	The Effects of Diagnosis...

I shall notify the NARST President and Executive Secretary immediately upon determination of the Committee's selection.

If the second round run-off does not reveal a clear winner, I will recommend that the authors of both articles receive the JRST Award for Volume 15.

One of the Committee members, Dr. John Smith of the University of Washington, has submitted his resignation. John will be on sabbatical next year and will not be able to participate on the Committee. I shall look for a new appointment from the Board.

The NARST President and Executive Secretary have copies of all communications between me and the Committee members. The Committee work has gone smoothly and we have no recommendations for changes in the procedure for next year.

TO: NARST Board DATE: _____

REPORT: Patron Award Committee

FROM: John Wilson Business Phone: _____

Committee Members: Pinchas Tamir, Joe Novak,
(If appropriate)
Craig Sipe, Arlan Gullickson,
Jean Beard, Bill LaShier, Jerome Ciesla

Report for the Board:

* Linda De Ture

For Your Information

The Patron's Award

In response to a growing concern for research in Science Education, Wayne Welch, president of NARST 1973-74, outlined to the Executive Board a new award to be called the PATRON'S AWARD, the purpose of the award as approved by the Executive Board in 1974 was to solicit research proposals from the membership which a) defined major problems in Science Education, and b) delineated procedures for investigating them. During this early years of the award, copics were selected by the NARST Research Committee. This award, it was anticipated, would provide recognition to both researchers and patrons. It also represented a commitment of NARST to research in Science Education.

A Patron's Award Committee, appointed by the Executive Board, and first chaired by James Gallagher outlined the procedures and guidelines for the award which were later approved by the NARST Executive Board. These guidelines which then also included a cash prize, stressed the following characteristics:

1. The problem to be studied shall be well defined.

2. The conceptual framework from which the problem arises shall be described.

3. An adequate research base for the problem shall be identified and summarized.

4. At least two effective strategies for studying the problem shall be specified.

5. Any proposed design shall be experimental or quasi-experimental, permitting control and manipulation of variables.

A rating form was constructed to guide the selection of the best research proposal (from those submitted to the committee) based on the above characteristics. Two awards were given under these guidelines.

In 1977, the award was modified by the Executive Board to be given to the best research paper presented at the previous year's NARST convention. However, the purpose and guidelines of the award remained the same...to encourage members to pursue research questions relevant to science education. Now, however, completed research studies rather than just proposals would be reviewed. One award has been given under these guidelines.

At present, all research papers and paer sets presented during a NARST convention are invited to compete for the Patron's Award. Shortly after the convention, materials are sent to presentors; the papers sent to the committee chaiperson are the ones reviewed for the award. The rating process consists of a two step process:

(over)

Step One: Each paper is sent to two committee members for rating. Each rator is also given a copy of the previous year's winner as a means to help standardize their judgements. Three types of judgements are provided by the rators:

1) An assessment using the identified characteristics of research,
2) a reject-accept assessment,
3) a rating of relative standing compared to last year's winner.

These data are utilized to identify the five or six best papers. Where conflicts and contradictions exist in the ratings, additional ratings are obtained by the chair...

Step Two: The five or six best papers are read by all committee members, each providing a simple rank ordering of the papers along with their comments and recommendations.

This year as in the past, the top five or six papers have varied as to the type and nature of research reported, the questions asked, and conceptual framework utilized.

Past winners include the following:

1975 John J. Koran
1976 Anton E. Lawson
1977 None Given
1978 Rita E. Peterson

Past Chairpersons for the Patron's Award included the following:

1974-75 James Gallagher
1975-79 John T. Wilson

Compiled by:

John T. Wilson
Janaury, 1979

TO: NARST Board DATE: _____

REPORT: International Committee

FROM: J. W. George Ivany Business Phone: _____

Committee Members: (if appropriate) Roger Anderson, Mike Padilla, Paul Beisenherz, Joe Riley, Don Humphreys, Doug Roberts

Report for the Board:

Committee Dissolved

TO: NARST Board DATE: February 20, 1979

REPORT: Membership Committee

FROM: Robert E. Yager Business Phone: 319; 353-3600

Committee Members: (if appropriate)

Leon J. Zalewski (1979)	Charlotte M. Boener (1980)
William B. McIlwaine (1979)	Chris A. Pouler (1981)
Glen Clark (1980)	Leonard Simons (1981)

Report for the Board:

The Membership Committee has been very active with recommendations, new plans, support for state membership contacts. Membership materials were made available at each Area Convention of NSTA, at NABT, at SSMA, and at ASCD. New state representatives were located (though we still at missing such contacts for Delaware, Montana, New Hampshire, and North Dakota; see attached listing).

State membership contacts have attended meetings of science educators in most states, forwarded lists of nominees to the Executive Secretary for follow-up letters of invitation, conducted seminars on campuses with large graduate programs in science education, made mailings within the particular states, organized display tables at a variety of state meetings, and contacted current members asking their help with membership recruitment. One innovation effort was undertaken by George O'Hearn who prepared and distributed a special return postcard effort in Wisconsin. The results of this effort should be studied in the months ahead.

Six general mailings were forwarded to committee members and state contacts. These suggested activities and asked for feedback. Where available the membership posters were used and reported as effective.

State membership contacts should be especially thanked for the great amount of time spent, the innovative ideas proposed, and their success in locating funds for NARST activities at their respective institutions. The Executive Secretary proved to be invaluable for all membership activities. The Committee extends its thanks for following through in an excellent fashion and providing the needed support.

Special Recommendations:

1) that the president write a personal letter of thanks to State Membership contacts for their work during 1978-79.

2) that the new president routinely write to these same contacts welcoming them to a new NARST year and encouraging activity at the State level.

3) that the new chairperson be given a budget for initiating some new ideas (some firm ones were proposed by committee members but could not be implemented because funds were unavailable.

4) that the program committee consider the negative impact of the high rejection rate of program proposals.

5) that future committees work more closely with the NSTA Research Division -- with respect to membership promotion.

STATE MEMBERSHIP COORDINATORS

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Martha Calton
Science Department
Headland High School
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ALASKA

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206 Shibles Hall
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210 Gittings Avenue
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261 Waltham Street
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University of South Dakota
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College of Education
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Roger O. Olstad
Science Education
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WISCONSIN

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Educational Development
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Green Bay, Wisconsin 54302

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Education Coordinator
The State of Wyoming
Department of Education
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BRASIL

Myriam Krasilchik
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S.P. Brasil

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School of Education
The Flinders University of
South Australia
Bedford Park, South Australia 5042

IRAN

Masood Sadrol-Ashrafi
Bu-Ali Sina University
Education Cluster
P.O. Box 217
Hamadan, Iran

TO: NARST Board DATE: _____

REPORT: Placement Services Committee

FROM: John E. Penick Business Phone: 353-4506

Committee Members: (if appropriate) David Boulanger, Thaddeus Fowler, Donna Siemro, Kenneth Moore, Gerald Abbeg, John Staver

Report for the Board:

TO: NARST Board DATE: January 23, 1979

REPORT: Representative to AAAS

FROM: Herbert A. Smith Business Phone: 303-491-6741

Committee Members: (if appropriate)

Report for the Board:

I attended the AAAS convention in Houston from January 3 to January 8 and participated in the Section Q sessions and the Section business meeting. I also participated in the deliberations of the AAAS Council. Under a new amendment adopted during the past year, the retiring Section Chairman is a member of the Council.

In the report filed a year ago, the background of developments with respect to an "issues" paper was described. During the past year progress has been made in bringing this project to its final stages. Dr. Marjorie Gardner was Section Q Chairman this past year and pursued the matter industriously. I think she made the very wise decision to involve members of the AAAS Board in early discussions and in a review of draft copies. Some Board members have developed considerable interest in the project and I think this increases the likelihood that we will eventually get a substantial publication. Copies of the draft were submitted to all members of the AAAS Council and to all affiliate representatives of Section Q with responses invited. Some of the input has been used to make further refinements of the document.

I do not think that the document will be of exactly world shaking dimensions. It is the result of the efforts of a great many people and many compromises had to be made during the course of the discussions. Nevertheless, my personal belief is, that it is highly important because if the AAAS Board will endorse such a statement, even though it might say much less, and say it much less abrasively, than many of us would like, it is still a statement which will demand attention. The AAAS represents over 130,000 members and its affiliates in the aggregate include a great many thousands more. Thus, a statement endorsed by such a group reflects the action of the representatives of a very large and influential segment of the scientific community.

Section Q sponsored a resolution for consideration by the AAAS Council at Houston. This resolution related to the retention of the present science education directorate in the National Science Foundation rather than transferring it as a unit to the proposed new Department of Education. It seems to be pretty well agreed that the Department of Education will probably be established during

this session of Congress. Thus, such a resolution seemed timely. It was a bit unusual that the Council saw fit to endorse this resolution because its submission did not follow the regular procedure. The usual procedure for resolutions to be considered by Council requires that they be submitted and screened in advance. Under special procedures, however, it is possible to submit a resolution at the time of a national meeting and have it considered. I might say, however, that the fate of such resolutions in the past has usually been rather dismal. In this case, however, after some debate on the floor of the Council, the resolution proposed by Section Q passed by a very comfortable majority. Perhaps this indicates that Section Q has finally become of age and is now gaining some prestige and respect within the Association.

At the close of the meeting in Houston, Fletcher Watson became the new Chairman of the Section. I believe he is as fully committed to seeing the issues project completed as both Marjorie Gardner and I were during our term of office. I look for the paper to receive final action by the Board some time in late spring or early summer.

It has been a pleasure to serve as your representative.

8. Agenda Item 8. Urgent Matters Presented by Section Committees. The Section Committee of Section Q (Education) presented the following resolution for the Council's consideration.

> Whereas the American Association for the Advancement of Science has long supported the need for effective education in the sciences and for the public understanding of science, and
>
> Whereas the continuing collaboration of scientists and educators within the structure of the National Science Foundation has contributed to the identification and resolution of issues in science education, and
>
> Whereas the transfer of the educational activities of the National Science Foundation to the proposed Department of Education would sever this close working relationship between the scientific and educational communities,
>
> Be it resolved that the Council of the Association for the Advancement of Science supports the retention of science education as an integral part of the National Science Foundation.

The Council voted to amend the resolution by substituting "recognized" for "supported" in line 2; by inserting "Therefore" at the beginning of the final paragraph; and by inserting "American" before "Association" in the first line of the final paragraph. The Council voted to adopt the resolution as thus amended.

MEMO TO: NARST Executive Board

FROM: Editor, Journal of Research in Science Teaching

DATE: March 1, 1979

RE: Annual Report of the Journal Editor

1. Area of Concern and Presidential Charge

1. Execute policies recommended by the Publication Advisory Committee and approved by the NARST Board of Directors.

2. Continue working relationships with Editorial Advisory Board.

3. Work with Wiley to facilitate the printing and distribution of the Journal.

4. Recommend changes to the publication Advisory Committee for their approval prior to submission to NARST Board of Directors.

2. Activities

As my final report to this board, I would like the privilege of expressing my deep appreciation for the high honor and responsibility you have entrusted in me as editor of your Journal. This opportunity to build on the excellence that had been established by Professor O. R. Anderson and his predecessors has been a challenge that I've welcomed. Editing a Journal such as ours illustrates a continuing challenge to make intentional nudges of our profession in directions of clear concise communication of our research efforts. In this task, I have found a deep and rewarding fulfillment as well as a personal enrichment. I have grown. I can assure you that your next editor will be beginning on a five-year trek that will be facilitated by the cooperation that has been so characteristic of both the NARST Executive Board and John Wiley. My deepest appreciation goes to both the NARST leadership and Allan Wittman and staff of John Wiley for the many ways each have made my task a most enjoyable one.

And now to our business.

a. Based on nominations from members of the Editorial Advisory Board and the members of the NARST Executive Board, the following recommendations have been approved by the NARST Executive Board.

1) Editorial Advisory Board members whose terms are completed December 31, 1979.

Professor Glen Aikenhead
(Appointed January 1, 1973)

Professor John Koran Jr.
(Appointed January 1, 1974)

2) Editorial Advisory Board reappointments.

Professor Aikenhead (December 31, 1982)
Professor Koran (December 31, 1982)

3) Editorial Advisory Board new appointments.

Professor Ronald Anderson
(December 31, 1982

(Please see Attachment A for membership of current Editorial Advisory Board)

b. Working Relationship with Editorial Advisory Board

We continue to have a hard working Editorial Advisory Board. The manuscript flow continues to reflect the very hard work of the Board.

(Please see Attachment B for data on manuscript flow)

c. Working Relationship with Wiley

Our work with Wiley and especially Allan Wittman continues to be tremendous. We are on schedule with a product that is showing a stable circulation. A change in price was approved for Volume 16. Non member subscribers (N = 1333) will pay $35.00 in 1979 to meet postal regulations, charge to member subscribers (N = 701) must be 50% or $17.50. This will be an increase of $2.50 per year. A healthy royalty has been forwarded to President Okey of $1,183.76.

4. Recommendations for Board Action

Letter of commendation from the President to each of the Editorial Advisory Board members for their hard work would be very much appreciated.

ATTACHMENT A

EDITORIAL ADVISORY BOARD
FOR VOLUME 16

MEMBERS	Term Appointed	Completed
Aikenhead, Glen S. College of Education University of Saskatchewan Saskatoon, Canada S7N 0W0	Jan. 1, 1973 (Reappointed, January 1, 1979)	Dec. 31, 1982
Anderson, Ronald School of Education University of Colorado Boulder, Colorado 80302	Jan. 1, 1979	Dec. 31, 1982
Bartholomew, Ronald Science Education Center The University of Texas at Austin Austin, Texas 78712	Jan. 1, 1975	Dec. 31, 1979
Hall, Gene E. Education Annex The University of Texas at Austin Austin, Texas 78712	Jan. 1, 1974 (Reappointed, January 1, 1978)	Dec. 31, 1981
Hansen, Richard 2575 Palisade Ave. Bronx, NY 10463	Jan. 1, 1974	Dec. 31, 1979
Howe, Ann Syracuse University 101 Heroy Geology Hall Syracuse, NY 13210	Jan. 1, 1975	Dec. 31, 1979
Ivany, J. W. George Dean, Faculty of Education Simon Fraser University Burnaby, British Columbia Canada V56 1S6	Jan. 1, 1970 (Reappointed, January 1, 1977)	Dec. 31, 1980
Koran, John J., Jr. University of Florida Norman Hall, 353 College of Education Gainesville, Florida 32611	Jan. 1, 1974 (Reappointed, January 1, 1979)	Dec. 31, 1982
Krockover, Gerald H. Department of Education Purdue University West Lafayette, Indiana 47907	Jan. 1, 1978	Dec. 31, 1981
LaShier, William S., Jr. Curriculum and Instruction The University of Kansas Bailey Hall Lawrence, Kansas 66045	Jan. 1, 1978	Dec. 31, 1981

MEMBERS	Term Appointed	Completed
Okey, James R. Department of Science Education University of Georgia 212 Aderhold Hall Athens, Georgia 30602	Jan. 1, 1974	Dec. 31, 1979
Peterson, Rita W. Department of Teacher Education California State University Hayward, California 94542	Jan. 1, 1974 (Reappointed, January 1, 1978)	Dec. 31, 1981
Phillips, Darrell Science Education Center University of Iowa Iowa City, Iowa 52240	Jan. 1, 1976	Dec. 31, 1979
Raven, Ronald J. State University of New York at Buffalo 561 Christopher Baldy Hall Amherst, New York 14260	Jan. 1, 1971 (Reappointed, January 1, 1977)	Dec. 31, 1980
Rowe, Mary Budd National Science Foundation Washington, D. C. 20550	Jan. 1, 1970 (Reappointed, January 1, 1976)	Dec. 31, 1979
Simpson, Ronald D. Department of Mathematics and Science Education North Carolina State University Raleigh, North Carolina 27607	Jan. 1, 1976	Dec. 31, 1979
Smith, Edward Science and Mathematics Teaching Center Michigan State University East Lansing, Michigan 48824	Jan. 1, 1977	Dec. 31, 1980
White, Arthur ARPS 244 The Ohio State University Columbus, Ohio 43210	Jan. 1, 1976	Dec. 31, 1979
Zeitler, W. R., Associate Editor Department of Science Education University of Georgia 212 Aderhold Hall Athens, Georgia 30602	Jan. 1, 1965	Dec. 31, 1979

ATTACHMENT B

MANUSCRIPT FLOW

Task	9/74-8/75	9/75-8/76	9/76-8/77	9/77-9/78	10/78-3/79
A. Number manuscripts received	133	127	117	130	62
B. Number of manuscript reviews by members of Editorial Advisory Board	434	406	301	228	92
C. Number mms returned to authors					
a. Revise as Position Papers	-0-	8	9	4	2
Returned by author	-0-	3	4	4	1
b. Revise as Research Papers	75	28	21	36	12
Returned by author	29	28	15	26	7
c. Revise as Research Reports	56	98	105	207	67
Returned by author	17	49	60	115	31
d. Not suitable for publication					
a. by editor	27	9	10	5	4
b. by author	-0-	47	38	42	24
D. Number mms submitted to Wiley	72	76	82	116	49
a. Position Papers	1	5	4	6	-0-
b. Research Papers	40	21	14	26	7
c. Research Reports	28	39	52	76	37
d. Comments and Criticism	3	11	11	8	5
e. Book Reviews	-0-	-0-	1	-0-	-0-

Summary

4.5 Years Experience	Received	Accepted	%
By Category			
Manuscripts	569	395	69%
Position Papers	23	16	72%
Research Papers	172	108	63%
Research Reports	533	232	44%
Comments and Criticism	38	38	100%
Book Reviews	1	1	100%

EDITORIAL ADVISORY BOARD ACTIVITY
October 1, 1978 -- March 1, 1979

	Manuscripts Referred and Returned	Manuscripts Referred but not yet Returned
1. Aikenhead	5	2
2. Anderson	2	0
3. Bartholomew	5	1
4. Hall	6	0
5. Hansen	6	1
6. Howe	6	1
7. Ivany	5	1
8. Koran	6	0
9. Krockover	5	0
10. LaShier	5	1
11. Okey	6	0
12. Peterson	5	2
13. Phillips	4	2
14. Raven	8	1
15. Rowe	1	2
16. Simpson	5	1
17. Smith	5	2
18. White	0	3
19. Zeitler	7	0
Total	92	20

NARST
Future Meeting Sites and Dates

With NSTA

1979 Atlanta
NARST March 21(W) - 23(F)
NSTA March 23(F) - 27(T)

1980 Anaheim
NSTA March 21(F) - 25(T)

1981 New York
NARST April 1(W) - 3(F)
NSTA April 3(F) - 6(M)

1982 Chicago
NSTA April 2(F) - 5(M)

1983 Dallas
NARST April 6(W) - 8(F)
NSTA April 8(F) - 12(T)

With AERA

1980 Boston
AERA April 7(M) - 11(F)
NARST April 11(F) - 13(S)

1981 Houston
AERA (no dates set)

1982 Denver
AERA April 12(M) - 16(F)
NARST April 16(F) - 18(S)

1983 Washington
AERA (no dates set)

1984 ?

NORTHWESTERN UNIVERSITY
EVANSTON, ILLINOIS 60201

THE SCHOOL OF EDUCATION

December 23, 1978

Dr. Paul H. Joslin
Executive Secretary, NARST
Memorial Hall
Drake University
Des Moines, Iowa 50311

Dear Dr. Joslin,

I just received your letter informing me that I have been made an Emeritus Member of NARST.

I am touched and honored by the contents of your letter, and I am so pleased that I will be receiving all the present services of the Association. I want so much to keep in touch.

Thanks also for including the names and present addresses of those admitted to Emeritus status along with me.

I noticed that you did not include the street number when you wrote me. It so happens that there is another person named Victor living in Sun City (the only other one, infact) and wouldn't you know that he too lives in Calico Drive. Since I want to be sure I receive all NARST correspondence, will you please add the street number to my address label on your address forms. I am attaching a label with the exact street number.

Edward Victor
9819 Calico Drive
Sun City, AZ 85373

Thank you again for your wonderful letter. I shall keep it in my files.

Cordially yours,

Edward Victor

Edward Victor

Chapel Hill, N. C. 27514
December 27, 1978

Dr. Paul H. Joslin
Executive Secretary
Nat. Assn. for Research in
Science Teaching
Memorial Hall of Drake University
Des Moines, Iowa 50311

Dear Prof. Joslin:

Emeritus Membership in NARST is an honor and courtesy which I appreciate very much. It does make one feel very good to be a part of the group that you received December 1, 1978. Thank you and please convey my appreciation to officers and Board members.

I want to give special recognition to each of the Life Members who have supported the Association in noteable professional, financial and devoted ways. They deserve our highest recognition and honor.

My professional involvements are rather circumscribed compared to what I was doing ten years ago, when I retired. I do have some professional involvements such as a curriculum consultant with the North Carolina Heart Association, a committee member at the University of North Carolina Medical School in a Committee on the Protection of the Rights of Individuals in Medical Research, and The Building Fund Design Committee of the National Science Teachers Association. I do communicate with Dr. Paul Hounshell who is in charge of Science Education here at the University. I was recently recognized for more than 50 years of continuous membership in Phi Delta Kappa.

You asked about other persons that might be considered for Emeritus Membership. Let me suggest that you consider Dr. N. E. Bingham and Dr. Fletcher Watson.

Very cordial greetings,

Philip G. Johnson

THE CONGREGATIONAL - UNITED CHURCH OF CHRIST
114 North Henry Street
EDGERTON, WISCONSIN 53534
(608) 884-6514

December 27, 1978

Dr. Paul H. Joslin, Executive Secretary
National Association for Research in Science Teaching
Memorial Hall
Drake University
Des Moines, Iowa 50311

Dear Dr. Joslin:

Please express my deep pleasure and appreciation to the Executive Committee for its action in electing me as an Emeritus Member of NARST.

Throughout the years of service and dedication to the ideals and thrusts of this Association I can assure you that I have received much more than I have given.

It's a very distinct honor and privilege to be associated with such fine people, and at the same time, the country's outstanding educators.

Warmest regards,

James R. Irving, Pastor

JRI:wm

THE PENNSYLVANIA STATE UNIVERSITY
CHAMBERS BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Education
Division of
Curriculum and Instruction

February 8, 1979

Dr. James R. Okey
Department of Science Education
University of Georgia
Athens, GA 30602

Dear Jim,

This is a letter which is difficult for me to write, but I think it may reflect the opinion of many of our members. I have paid my dues for the coming year but will have to consider seriously whether I will continue my membership after that. I realize that costs for everything are too high. So, when one makes decisions about where to cut one looks for value received as a criterion. As I look at NARST services, I believe the costs of membership may make it necessary for me to think seriously before renewing for the 1980 year. What can be done - I don't know any easy solution. However, it seems evident that the NARST Board should consider if anything can be done to either decrease costs or increase services. I think there are many of our members who share this view.

Very truly yours,

H. Seymour Fowler
Professor of Science Education

HSF/llw

① Send letter
② Make increased services of newsletter to begin
③ Listing of research in progress as news service
④ Joint work with NSTA

NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

BY-LAWS

SECTION I: MEMBERSHIP

A. Eligibility

This Association shall consist of Members who have had the preparation, demonstrated the competence, and evidenced the interest to make important research contributions to the field of science education. The usual preparation for members is advanced graduate work in science education or its equivalent. Competence is usually demonstrated by a report of a research study or of an application of research in science education.

B. Classes of Membership

The membership of the Association shall consist of Regular Members, Sustaining Members, Patron Members and Emeritus Members.

Regular Members are those who meet eligibility requirements and pay annual dues. Sustaining Members are those who meet eligibility requirements and pay specified additional dues as a source of revenue. Patron Members and Patrons may be individuals, associations, institutions, or corporations who meet eligibility requirements and who pay specified annual dues. Emeritus Members are members in good standing, who, upon retirement from professional service, are voted to that status by the Executive Board, acting upon a written request. Emeritus Members shall receive full rights and privileges of the Association without cost, except for the journal, which may be purchased at the member contract rate.

All new members shall supply the information requested on an application form that can be obtained from the Executive Secretary.

SECTION II: DUES AND CONTRIBUTIONS

The total annual dues shall include Association dues and cost for the Journal of Research in Science Teaching. The association dues shall be recommended by the Executive Board and a majority vote of members by mail ballot returned within 30 days of mailing. The subscription costs for JRST shall be approved by the Executive Board. The total dues shall cover one calendar year and shall become payable at the beginning of the calendar year.

Dues for Sustaining Members shall be double the dues for Regular Members.

Minimum annual dues for Patron Members will be set by the Executive Board and will exceed annual dues for Regular and Sustaining Members. Associations, institutions, or corporations may be admitted as Patrons with suitable contributions negotiated by an ad hoc Patrons Activities Committee.

Any member may resign by sending a letter of resignation to the Executive Secretary. If the dues of a member remain unpaid beyond six months after the dues notice, the Executive Secretary shall remove the name from the membership list. Any former member may be reinstated without prejuduce upon request to the Executive Secretary and upon payment of the current dues.

SECTION III: OFFICERS AND EXECUTIVE BOARD

A. Officers

The officers of the Association with specific duties include:

1. PRESIDENT who shall act as chairperson of the Executive Board, have general charge of the affairs of the Association, preside at all business meetings, and be an ex-officio member of all committees.

2. PRESIDENT-ELECT who shall preside at all business meetings in the absence of the president and be chairperson of the Program Committee for the Annual Meeting.

3. PAST-PRESIDENT who shall serve as chairperson of the Policy Advisory Committee and serve as chairperson of the Election Committee.

4. EXECUTIVE SECRETARY who shall keep an account of the receipts and expenditures, pay all bills of the Association, make a report to the members at the Annual Meeting, and prepare a proposed budget for the forthcoming year.

5. RESEARCH COORDINATOR who shall act as chairperson of the Research Committee, organize and supervise the research activities of the Associaton (subject to review by the Executive Board) and make a report to the Association at the Annual Meeting.

6. BOARD MEMBERS-AT-LARGE who shall serve on standing and special committees as requested.

B. Executive Board

The officers (president, president-elect, the immediate past president, research coordinator), six Executive Board Members-at-Large, and the president of affiliated groups as approved by majority vote of the Board shall constitute the Executive Board of the Association and each shall hold an equal vote in the business of the Board. Ex-officio members of the Executive Board shall consist of the Executive Secretary, JRST Editor, the chairperson of the standing committees not otherwise members of the Executive Board.

underline?

The Executive Board shall be empowered to transact all official business for the Association. It will meet at the time of the Annual Meeting and, if needed, at one other time during midyear. The Executive Board shall consider all business and accept or reject decisions and actions taken by the officers between meetings of the entire Executive Board. The Executive Board may use the mails and/or wire service for transacting business that can not be delayed until the time of one of its regular meetings.

Only regular members of the Executive Board may cast official votes in the transaction of business. Ex-officio members of the Executive Board may enter fully into all discussions and other matters concerning the business brought before the Board either in formal meetings or by mail or wire transactions, but ex-officio members have no vote in the transaction of business of the Executive Board.

C. Terms of Office and Eligibility

Only Members shall be eligible to hold office. Candidates for office of president-elect must have been active members of the Association. This will usually mean prior service as a member of the Executive Board or chairperson of a standing committee. Neither the president nor president-elect shall be eligible for election to the same office for a second term.

Two of the six Board Members-at-Large shall be elected to three-year terms each year. The president with the consent of the majority of the Executive Board shall appoint Members-at-Large to fill positions vacated before completion of the term. Board Members-at-Large shall be ineligible for serving more than one three-year term.

The president-elect shall assume the presidency if the office is vacated before the completion of the term. If serving such an unexpired term results in six months or more in the office of president, a new president-elect shall be appointed by the Executive Board; such persons will become president the following year. If less than six months is involved, the new president shall serve for the entire next year as president as well. The office of president-elect will then remain unfilled until the regular time for elections.

In the event that both the office of president and president-elect are vacated at the same time, or within the same term, the Executive Board shall appoint members of the Board to fill the unexpired terms and both offices will be filled the following year through election.

The Executive Secretary shall be appointed to a five-year term.

The Editor shall be appointed by the Executive Board to a single five-year term.

The term of research coordinator shall be a three-year term. A person may not hold this office for more than two terms. If the research coordinator stands for re-election, a competitive slate is required where there is at least one other candidate for the office.

The terms of office for the Executive Secretary and the Editor can be reduced by two-thirds vote of the other members of the Executive Board. If the offices of editor, executive secretary, or research coordinator are vacated before the end of the separate terms, the Executive Board shall fill the unexpired terms by appointment.

D. Election of Officers

At the regular Annual Meeting, the president shall appoint an election committee of three to prepare mail ballots for electing officers for the next ensuing year. A slate of two or more nominees shall be selected for each vacant office.

The slate proposed by the Election Committee shall be published in the Newsletter at least four (4) months prior to the Annual Meeting.

Additional nominations may be made by petition of ten (10) members. Said petitions shall be in the hands of the Executive Secretary three (3) months prior to the Annual Meeting.

Ballots shall be mailed by the Executive Secretary to all members eligible to vote two (2) months prior to the Annual Meeting. The completed ballots shall be returned to the chairperson of the Election Committee for counting no later than four (4) weeks from date of mailing to members.

Election shall be by plurality, in serial order. In event of a tie vote, the decision shall be made by vote of the members present at the Annual Meeting.

All terms of officers shall begin at the close of the Annual Meeting at which the election results are announced and shall continue until the close of the Annual Meeting of the year the term ends.

SECTION IV: PUBLICATIONS

A. Editor

An editor shall be selected in the manner as previously described. The editor shall serve on the Executive Board and the Publications Advisory Committee in an ex-officio capacity. The editor shall absent himself from these sessions when policies and considerations are being made where such absence is suggested.

The editor shall administer all publication ventures of the Association. Responsibilities may be delegated to others with approval and consent of the Publications Advisory Committee and the Executive Board.

The editor shall prepare an annual report for the meeting of the Executive Board, for the Publications Advisory Committee, and for the Annual Business Meeting.

The Editor shall work with the Editoral Board in the publication of the Journal of Research in Science Teaching. Changes in policy shall be approved by the Publications Advisory Committee and the Executive Board.

The Editor shall present nominations for positions on the Editorial Board to the Executive Board for confirmation.

B. Editorial Board

The editor, the associate editor, and members of a special review committee shall be known as an Editorial Board with the editor as chairperson. The Editorial Board shall be responsible for evaluating papers submitted for publication in the Journal of Research in Science Teaching.

The Editorial Board will be responsible for carrying out the policies suggested by the Publications Advisory Committee and approved by the Executive Board. The size of the Editorial Board shall be determined by the necessary divisions of labor in preparing the Journal. The Editorial Board may request changes in policy by making recommendations to the Publications Advisory Committee for appropriate consideration. The Executive Board may make specific recommendations directly to the Editorial Board concerning Journal policy.

SECTION V: MEETINGS

The Executive Board shall arrange the time and place of the Annual Meeting and may arrange additional meetings. The business meeting of the Association shall be held at the time and place of the Annual Meeting and the members present (with a minimum of 5% of the total membership) shall constitute a quorum for conducting the business of the Association.

Robert Rules of Order, Revised, shall govern the conduct of all meetings held by an group whatsoever in conducting the business of the Association except as otherwise specified in these By-Laws.

SECTION VI: COMMITTEES

The President, with the approval of the Executive Board, shall appoint all standing and special committees. Standing committees include the following with duties as outlined:

1. POLICY ADVISORY COMMITTEE - Members include: Immediate past president as chairperson; two members (with two-year rotating terms), president-elect (ex-officio). Duties are: annual review of By-laws, changes in structure or orientation of the Association, review of new activities or ventures of the Association.

2. FINANCIAL ADVISORY COMMITTEE - Members include: chairperson (three-year term), three members (with three-year rotating terms), executive secretary (ex-officio). Duties are: consider annual budget prepared by the executive secretary, approve program expenses, approve publication costs and new ventures, offer advice and recommendation to the Executive Board regarding all financial affairs of the Association, conduct an annual audit of the financial accounts of the Association.

3. PUBLICATIONS ADVISORY COMMITTEE - Members include: chairperson (three-year term), three members (with three-year rotating terms), editor (ex-officiao). Duties are: establish policy concerning the Newsletter, the Journal, and special publication ventures of the Association, review arrangements with editors of publications, suggest changes in yearly publication practice to the Executive Board.

4. PROGRAM COMMITTEE - Members include: president-elect as chairperson, four members (with two-year rotating terms), research coordinator (ex-officio). Duties are: establish theme and format for annual meeting, arrange for special speakers and symposia, evaluate abstracts for contributed papers. (A local arrangement committee may be established if desired).

5. RESEARCH COMMITTEE - Members include: research coordinator as chairperson, three members (with three-year rotating terms). Duties are: prepare yearly reviews of research in science education, work closely with ERIC Center, recommend needed areas of research, research symposia, and training programs.

6. ELECTION COMMITTEE - Members include: Immediate past president as chairperson, two members (with one-year terms each). Duties are: establish slate of officers for each election four months prior to the date of the Annual Meeting, make arrangements for preparation and distribution of ballots three months prior to the Annual Meeting, tabulate election results, notify candidates of the outcome of the election a month prior to their assuming office, announce election results at Annual Meeting, arrange for installation of new officers and transfer of the responsibilities of Executive Board for the Association.

The nature and duties of special committees shall be specified at the time of appointment.

Each special committee appointed by a president shall be considered automatically discharged at the close of the Annual Meeting next following the appointment, unless specific action to continue the appointment be taken by the President who enters the office at the close of the Annual Meeting.

Standing and special committees shall prepare reports for the Annual Business Meeting and at such other times as requested by the President.

SECTION VII: AFFILIATIONS

The Association may, on action of the Executive Board, affiliate with international, national, regional, and local scientific and professional groups where combined efforts will contribute to the overall purposes of the Association but in no way reduce the autonomy of the Association. Upon vote of the Executive Board, the president of an affiliated organization may be named a member of the Executive Board.

SECTION VIII: DISSOLUTION

The following provisions as to dissolution shall be observed in so far as compatible with the Minnesota Nonprofit Corporation Act, NSA 317.44-61.

In the event of dissolution of the Association, the Executive Board shall, after payment of debits and obligations, transfer the net assets to one of its affiliated organizations if such affiliated organization is then exempt from Federal income taxes as a charitable and/or educational organization. Such assets shall be used to promote research in science education. If, among the affiliated organizations, none is so exempt, the net assets, as aforesaid, shall be transferred to any nonprofit university, or to any other tax exempt agency selected by the Executive Board because of its interest in improving and advancing research in science education.

SECTION IX: AMENDMENTS

Proposed amendments to the Bylaws will be prepared by the Policy Advisory Committee and submitted to the Executive Board for approval. Proposed amendments so approved will be mailed by the Executive Secretary along with a ballot to Members. A majority of those responding within 30 days of the date of mailing must indicate approval before an amendment is accepted. Upon acceptance the amendment will become effective.

Adopted - 1970
Revised - 1973
Revised - 1974
Revised - 1976
Revised - 1978

6/1/78

[Found]ed 1928
[In]corporated 1961

Sponsoring The Journal of Research in Science Teaching
Affiliated with NSTA, AAAS and ICASE

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NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

Memorial Hall Drake University Des Moines, Iowa 50311

[EXEC]UTIVE SECRETARY
... Des M[oines], IA 50311

[PRE]SIDENT
Department of Science Education
... of Georgia

[PRE]SIDENT-ELECT
... Physical Sciences Ctr. Room 323
University of Oklahoma

[IMMEDIATE] PAST PRESIDENT
College of Education
... of Washington
Seattle, WA

[BO]ARD MEMBERS
... (1980)
University of Michigan
Ann Arbor ...

... (1980)
... Syracuse ...

Dr. J. W. ... (1979)

... Dept. Physics

... Education

[NEWSLETTER] EDITOR
Dr. ... Vanden Branden (1979)
... 50311

... EDITOR
Dr. ...

... COORDINATOR
... Physics Bldg.

... Teachers Association

1/31/79

Dear Jim:

Dr. Barbara Spector, Program Director for Education, NOAA -- Sea Grant, contacted me about the possibility of NARST (through its Executive Committee) writing a position statement favoring (supporting) Marine education in K-12 and related teacher training programs. She is also asking NSTA and AETS for supporting statements.

I told her I would ask the Board to consider her request, but could not anticipate their response. Perhaps you would like to contact her for further information concerning this before our Atlanta meeting. Her address is: NOAA, 6010 Executive Blvd., Rockville, Maryland 20852. Exactly what she wants is not real clear to me.

(301) 443-8886

Best personal regards

Roger B. Olstad

cc. Jack Renner
Enclosure

P.S. I believe she (Spector) is a NARST member.

This is a Success calendar.

1979

JANUARY

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ITEMS FOR THE NARST BOARD MEETINGS
ATLANTA, GEORGIA

7:30 a.m. - 12:00 noon, Wednesday, March 21, 1979

7:15 a.m. - 9:00 a.m., Friday, March 23, 1979

1. Changes in the standing committee structure of the NARST

   a. Change the name of the Patron Awards Committee to the NARST Awards Committee.
   b. Dissolve the NARST/NSTA Program Committee. Assign the duties (see Attachment A) to the NARST Awards Committee.
   c. Dissolve Patron Activities Committee.
   d. Establish Research Grant Activities Committee (see Attachment B).
   e. Establish Program Criteria Committee (see Attachment C).
   f. Establish an NSTA Regional-Meeting Committee and inform the NSTA Convention Coordinator of its membership (see Attachment D).

2. Consider an action that would automatically make the Research Director of the NARST the organization's representative to the Research Committee of the NSTA.

3. Authorize the President to appoint an ad hoc committee to design a statement listing what the NARST believes the purposes of science education to be. This committee would report directly to the Executive Board through the President. The committee would be dismissed when the Executive Board accepted their final report.

4. Increase the length of the annual meeting from two days to three days to accommodate more of the program contributions submitted. A summary of the program contributions offered and accepted in 1978 and 1979 are found in Attachment D.

NARST AWARDS COMMITTEE

This committee selects the three or four outstanding papers presented at the NARST annual meeting which will be recommended to the NSTA for inclusion in the program of that organization two years later. That is the papers selected from the 1979 meeting of the NARST will be presented at the 1981 meeting of the NSTA.

The second duty of this committee is to select the outstanding paper presented at each annual meeting of the NARST. The presenter of that paper will receive the annual Outstanding Paper Award of the NARST. The award will be made at the annual meeting following the meeting at which the paper was presented.

The specific duties of the committee are to:

1) Publicize programs to assure all members are aware of them.
2) Review criteria for making the selections and recommend changes to the Executive Board.
3) Establish mechanisms for working with committee in selecting the awardees for the year.
4) Notify President and Secretary of the awardees in time for suitable certificate and where applicable, a check to be prepared.
5) Assist with award program at the luncheon.

ATTACHMENT B

Thank you for volunteering for committee work for the NARST. I have a special assignment with which the Association needs help.

You are no doubt aware that the NARST exists on membership dues and a few financial gifts. We have no contingency funds. To put it bluntly, we are always broke! The positive side is we are not in debt. But this serious financial restriction has limited the professional encouragement that the NARST can give to research. We would like to change that.

There has been a committee on the NARST committee roster for some years called the "Patron Activities Committee." That group was usually composed of the more senior members of the Association, and they devoted their efforts to encouraging members of the NARST to becoming Patrons. Craig Sipe was the last chairman of that committee and has suggested that the committee be made more active or be dissolved.

I am going to ask the Executive Board of the NARST to redefine that committee's duties. The duties I am going to suggest for the committee will be to devise a plan and implement it to contact industry, foundations, businesses, and other possible sources of funds on a yearly basis for contributions to build and maintain a research grant fund for the NARST. This would enable the Association to perhaps entertain proposals, identify needed research and select persons to do it, or any number of activities along the research line. I will also ask the Board to title this group Research Grant Activities Committee.

I see the duties of this committee as meeting as a group once a year at the annual meeting to make some plans. I see the rest of the committee's work being done by mail. If the committee is successful, perhaps a mid-year meeting could be held if necessary.

ATTACHMENT B

Please accept my invitation to become a member of this committee for a two-year term. The membership of the six-~~year~~ Member committee is this first year divided into one, two, and three-year terms. Hereafter, the term will be for three years. I cannot tell you any more about the committee because what the committee does or where it goes depends on its membership. After all the committee's places have been filled, I will send all the committee's complete membership. Perhaps then you could contact each other and arrange a meeting time before getting to Atlanta. I would love to meet with you in Atlanta. Please let me hear from you favorably. Your appointment must, of course, be approved by the Executive Board. Much thanks.

Sincerely,

John W. Renner
President-Elect

JWR:jrc

cc: Dr. James Okie

ATTACHMENT C

PROGRAM CRITERIA COMMITTEE

The duties of this committee shall be to establish the categories of contributions which will be considered for inclusion in the annual meeting. The categories of contributions presently considered are contributed papers, paper sets, symposia, round tables, techniques and procedures of research. This committee will also establish specific criteria to be used in judging contributions in each category. The committee will review existing criteria each year and make any changes they deem appropriate. The criteria will be forwarded to the President-Elect and the Executive Secretary by the first of August each year. The Executive secretary will publish the evaluative criteria in the fall issue of the newsletter with the call for program contributions. The committee members shall be appointed by the President-Elect and must be approved by the Executive Board.

ATTACHMENT D

NSTA REGIONAL-MEETING COMMITTEE

Each year the President shall appoint a four-member committee which shall represent the NARST in planning the regional meetings of the NSTA. The NSTA shall call on any member of the committee to assist in planning and presenting a regional meeting of the NSTA. The committee members representing the NARST shall have no responsibility to present any session in the name of the NARST. The committee membership shall be new each year.

ATTACHMENT E

SUMMARY OF THE PROGRAM CONTRIBUTIONS OFFERED

AND ACCEPTED IN 1978 and 1979

	1978			1979		
Category	No. Submitted	No. Accepted	Percentage	No. Submitted	No. Accepted	Percentage
Contributed Paper	83	51	61	104	63	60
Paper Sets	13	8	62	19	11	58
Round Table Discussion	5	2	40	3	1	33
Symposia	-	-	-	2	2	100
Techniques & Procedures of Research (Training Session)	7	4	57	3	3	100

NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING

1978-79

Officers and Committee Members

Executive Board (3 year terms)*		Term Ends
President	James R. Okey University of Georgia Athens, Georgia 30602	(1979)
President-elect	John W. Renner University of Oklahoma Norman, Oklahoma 73069	(1979)
Past President	Roger G. Olstad University of Washington Seattle, Washington 98195	(1979)
Research Coordinator	Arthur White Ohio State University Columbus, Ohio 43210	(1980)
Member-at-large	J. W. George Ivany Simon Fraser University Burnaby, British Columbia, Canada V5A 1S6	(1979)
Member-at-large	Ronald J. Raven State University of New York Amherst, New York 14260	(1979)
Member-at-large	Rita W. Peterson California State University Hayward, California 94542	(1980)
Member-at-large	Carl F. Berger University of Michigan Ann Arbor, Michigan 48103	(1980)
Member-at-large	Anton E. Lawson Arizona State University Tempe, Arizona 85281	(1981)
Member-at-large	Ann C. Howe Syracuse University Syracuse, New York 13210	(1981)
NSTA President	Edward P. Ortleb St. Louis Public Schools St. Louis, Missouri 63110	(1979)

*Note that here and elsewhere terms of office are given for regular committee members. Association officers, the editor, executive secretary, and others may be committee members for the period of time they hold a particular office or position.

Executive Board (cont.)

(Ex-Officio)	Executive Secretary	Paul Joslin Drake University Des Moines, Iowa 50311	(Dec. 1980)
(Ex-Officio)	JRST Editor	David P. Butts University of Georgia Athens, Georgia 30602	(Dec. 1979)
(Ex-Officio)	Chairpersons of the Standing Committees not otherwise members of the Executive Board		

Standing Committees

Policy Advisory Committee (2 year terms)		Term Ends
Chairperson (Past Pres.)	Roger G. Olstad University of Washington Seattle, Washington 98195	(1979)
	Richard L. Sagness University of South Dakota Vermillion, South Dakota 57069	(1979)
	Jane Bowyer Mills College Oakland, California 94613	(1980)
(Ex-Officio) Pres. elect	John W. Renner University of Oklahoma Norman, Oklahoma 73069	(1979)

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	Kenneth George University of Pennsylvania Philadelphia, Pennsylvania 19174	(1979)
	Wayne W. Welch University of Minnesota Minneapolis, Minnesota 55455	(1980)
	Glen S. Aikenhead University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N OWO	(1981)
(Ex-Officio) Executive Secretary	Paul Joslin Drake University Des Moines, Iowa 50311	(1980)

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	Marjorie Muehlke University of Pittsburgh Pittsburgh, Pennsylvania 15213	(1979)
	Vincent N. Lunetta University of Iowa Iowa City, Iowa 52242	(1981)
	Ann C. Howe Syracuse University Syracuse, New York 13210	(1981)
(Ex-Officio) Editor	David P. Butts University of Georgia Athens, Georgia 30602	(1979)

Program Committee (2 year terms)		
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	Patricia E. Blosser Ohio State University Columbus, Ohio 43210	(1979)
	William G. Holliday University of Calgary Calgary, Alberta, Canada T2N 1N4	(1979)
	William R. Capie University of Georgia Athens, Georgia 30602	(1980)
	James Shymansky University of Iowa Iowa City, Iowa 52240	(1980)
(Ex-Officio) Research Coordinator	Arthur White Ohio State University Columbus, Ohio 43210	(1980)

Research Committee (3 year terms)		Term Ends
Chairperson (Research Coordinator)	Arthur White Ohio State University Columbus, Ohio 43210	(1980)
	Gary C. Bates Teachers College Columbia University New York, New York 10027	(1979)
	Russell H. Yeany University of Georgia Athens, Georgia 30602	(1980)
	Claudia B. Douglas Central Michigan University Mt. Pleasant, Michigan 48859	(1981)

Election Committee (1 year term)		
Chairperson (Past Pres.)	Roger G. Olstad University of Washington Seattle, Washington 98195	(1979)
	Richard J. Rezba Virginia Commonwealth University Richmond, Virginia 23284	(1979)
	James J. Gallagher Michigan State University East Lansing, Michigan 48824	(1979)

Special Committees

JRST Award Committee (3 year terms)	Term Ends
Donald E. Riechard - Chairperson Emory University Atlanta, Georgia 30322	(1980)
James L. Neujahr City University of New York New York, New York 10032	(1979)
Robert G. Bridgham Michigan State University East Lansing, Michigan 48823	(1979)
John P. Smith University of Washington Seattle, Washington 98195	(1980)
Richard L. Campbell Florida Internationa University Miami, Florida 33199	(1980)
Eugene L. Chiappetta University of Houston Houston, Texas 77004	(1981)
Harold H. Jaus Purdue University West Lafayette, Indiana 47906	(1981)

Patron Award Committee (3 year terms)	Term Ends
John T. Wilson - Chairperson University of Iowa Iowa City, Iowa 52242	(1979)
Pinchas Tamir Hewbrew University Jerusalem, Israel	(1979)
Joseph Novak Cornell University Ithaca, New York 14853	(1979)
H. Craig Sipe State University of New York at Albany Albany, New York 10027	(1979)
Arlan R. Gullickson National Science Foundation Washington, D. C. 20550	(1980)
Jean Beard San Jose State University San Jose, California 95192	(1980)
William S. Lashier University of Kansas Lawrence, Kansas 66044	(1981)
Jerome L. Ciesla Florida State University Tallahassee, Florida 32306	(1981)

International Committee (3 year terms) — Term Ends

J. W. George Ivany - Chairperson (1980)
Simon Fraser University
Burnaby, British Columbia, Canada
V5A 1S6

O. Roger Anderson (1979)
Teachers College - Columbia University
New York, New York 10027

Michael J. Padilla (1979)
University of Victoria
Victoria, British Columbia, Canada
V8P 2C5

Paul C. Beisenherz (1980)
Louisiana State University
New Orleans, Louisiana 70126

Joseph P. Riley (1980)
University of Georgia
Athens, Georgia 30602

Donald Humphreys (1981)
Temple University
Philadelphia, Pennsylvania 19122

Douglas A. Roberts (1981)
Ontario Institute for Studies in Education
Toronto, Canada M5S 1V6

Membership Committee (3 year terms)	Term Ends
Robert E. Yager - Chairperson University of Iowa Iowa City, Iowa 52242	(1980)
Leon J. Zalewski Governors State University Park Forest South, Illinois 60466	(1979)
William B. McIlwaine Millersville State College Millersville, Pennsylvania 17551	(1979)
Glen Clark Memorial University St. Johns, Newfoundland, Canada	(1980)
Charlotte M. Boener Indiana State University Terre Haute, Indiana 47802	(1980)
Chris A. Pouler Prince George's County Public Schools Hyattsville, Maryland 20782	(1981)
Leonard Simons Elmira College Elmira, New York 14901	(1981)

Patron Activities Committee (No specific term)	First Appointed
Chairperson - (vacant)	
Ralph W. Lefler Purdue University West Lafayette, Indiana 47901	(1975-6)
Clarence H. Boeck University of Minnesota Minneapolis, Minnesota 55455	(1977-8)
Thomas P. Fraser Morgan State College Baltimore, Maryland 21216	(1977-8)
Frank X. Sutman Temple University Philadelphia, Pennsylvania 19122	(1977-8)

Placement Services Committee	Terms Ends
John E. Penick - Placement Coordinator and Chairman University of Iowa Iowa City, Iowa 52242	(1981)
F. David Boulanger University of Illinois-Chicago Circle Chicago, Illinois 60604	(1979)
Thaddeus W. Fowler University of Cincinnati Cincinnati, Ohio 45221	(1979)
Donna L. Siemro Govenors State University Park Forest South, Illinois 60466	(1980)
Kenneth D. Moore University of Tulsa Tulsa, Oklahoma 74104	(1980)
Gerald Abegg Boston University Boston, Massachusetts 02215	(1981)
John R. Staver Indiana University Bloomington, Indiana 47401	(1981)

Special Appointees

NARST/NSTA Program Committee 1980 NSTA Convention (1 year term)	Term Ends
John W. Renner University of Oklahoma Norman, Oklahoma 73069	(1979)
William R. Ogden East Texas State University Commerce, Texas 75428	(1979)
Anthony Lazzaro California State College California, Pennsylvania 15419	(1979)
Dorothy Gabel Indiana University Bloomington, Indiana 47401	(1979)

Representatives to Advisory Board
for "Investigations in Science Education" (3 year terms) — Term Ends

Joe C. Long (1981)
University of Georgia
Athens, Georgia 30602

Donald E. Riechard (1979)
Emory University
Atlanta, Georgia 30322

Frances Lawrenz (1980)
University of Minnesota
Minneapolis, Minnesota 55455

Convention Arrangements -- Toronto (1 year term)

Douglas Roberts - Chairperson (1978)
Ontario Institute for Studies in Education
Toronto, Ontario, Canada M5S 1V6

NARST Representatives on the 1978 NSTA Area Convention Planning Committees (1 year

James Shanks (1978)
California State University
Northridge, California 91324

William Lamb (1978)
Delta State University
Cleveland, Mississippi 38732

Richard Haney (1978)
University of Wisconsin--Milwaukee
Milwaukee, Wisconsin 53210

	Term Ends
Representative to AAAS (2 year term)	
Herbert A. Smith Colorado State University Fort Collins, Colorado 80523	(1980)
Representative to ICASE (2 year term)	
J. David Lockard University of Maryland College Park, Maryland 20742	(1980)
Newsletter Editor (No specific term)	
Robert J. Vanden Branden Drake University Des Moines, Iowa 50311	(1979)
Convention Evaluator (1 year term)	
John W. Renner - Program Chairman University of Oklahoma Norman, Oklahoma 73069	(1979)
ERIC/SMEAC Liason (No specific term)	
Arthur White Ohio State University Columbus, Ohio 43210	(1980)
JRST Editor Search Committee (1 year ad hoc committee)	
Ronald J. Raven - Chairperson State University of New York Amherst, New York 14260	(1979)
Stanley L. Helgeson Ohio State University Columbus, Ohio 43210	(1979)
Carl F. Berger University of Michigan Ann Arbor, Michigan 48109	(1979)
Wayne W. Welch University of Minnesota Minneapolis, Minnesota 55455	(1979)

Duties of NARST Committees and Special Appointees

POLICY ADVISORY COMMITTEE

1) Recommend new directions, activities, and functions for the organization. Identify new missions and new programs that the Executive Board might consider.

2) Review standing policies and procedures of the organization. Identify traditions and policies that the Board might consider altering.

3) Continue preparation for establishing a permanent Executive Secretary. Recommend guidelines to govern our moves in this direction.

4) Review minutes of last meeting of Board for other policies or specific points referred to the committee.

FINANCIAL ADVISORY COMMITTEE

1) Review proposed budget for 1978. Suggest changes and the rationale for them. Identify options for the Board.

2) Review policies regarding financing annual meeting. Determine if the meeting is self-supporting and the plans of the Program Committee are sound as to finances. Recommend changes, if any, in financing of the annual meeting.

3) Review finances connected with all publications including JRST, the newsletter, and any special publications. Identify the trends, the problems, the issues, and proposed solutions. The options open to the Board should be clearly described.

4) Review arrangements concerning audit. Determine if a three year audit is adequate, if the process is accomplished and if changes are needed.

5) Continue preparation of financial plans for establishing a permanent central office with a part-time Executive Secretary. Identify the financial implications of the various alternatives.

PUBLICATIONS ADVISORY COMMITTEE

1) Review formal policy regarding all NARST publications. Make recommendations to the Board on any changes needed in these policies.

2) Review directions and policies with editor of each publication. Identify problems and issues related to editors and/or their respective boards and advisory committees. Make policy suggestions which the Board should consider for adoption.

3) Suggest changes in publication practice and means by which publications be improved. Identify new publication ventures the Board might consider.

JRST AWARD COMMITTEE

1) Publicize the program to all members via the Newsletter, announcement in JRST, and/or other means.

2) Review criteria for making the annual selection. Recommend changes in criteria and selection policy to the Executive Board.

3) Establish working plan for selecting the awardee.

4) Notify President and Secretary of the final selection. Assist with preparation of certificate, check, and award arrangements at the annual luncheon.

PATRON AWARD COMMITTEE

1) Publicize program to assure all members are aware of it.

2) Review criteria for making the selection and recommend changes to the Executive Board.

3) Establish mechanisms for working with committee in selecting the awardee for the year.

4) Notify President and Secretary of the awardee in time for suitable certificate and check to be prepared.

5) Assist with award program at the luncheon.

6) Make recommendations regarding the research topic for the next year. Be prepared to discuss this and publicize it at the Annual Meeting as a part of the ceremony at the Annual Meeting.

PATRONS ACTIVITIES COMMITTEE

1) Develop guidelines for categories of Patrons. Recommend policies to the Executive Board regarding such guidelines (categories based on level of individual contribution, corporations, agencies and organizations).

2) Establish a plan for attracting patrons for the current year. Outline such a plan for approval and reaction by the Executive Board.

3) Proceed with implementing the plan.

4) Plan for special letters of appreciation, listing of names in annual program, recognition at the Annual Meeting and other kinds of recognition.

5) Develop long range plans for patron drive, special programs patrons may support, and ways of honoring patrons.

PROGRAM COMMITTEE

1) Establish themes and format for annual meeting.

2) Coordinate work with the Secretary-Treasurer to insure that all arrangements with the hotel and distribution of information to the membership are taken care of.

3) Organize procedures for evaluation of contributed papers. Determine criteria for paper evaluation and a time schedule.

4) Establish format for printed program, its distribution, and the printed collection of abstracts.

5) Plan for involvement and use of local members for registration, obtaining equipment and other purposes as needed.

RESEARCH COMMITTEE

1) Prepare yearly research review.

2) Work with the ERIC/SMEAC CENTER. Recommend formal policies regarding NARST and its relationship to the Center.

3) Recommend needed research in science education and recommend a means of communicating this information.

4) Prepare recommendations for the Board on research symposia and training programs.

5) Organize and conduct such research symposia and training programs as are approved by the Board.

ELECTION COMMITTEE

1) Establish slate of officers for report to the Board. The slate for 1976 should consist of two candidates for president-elect and four candidates for members of the Executive Board. These should be published in the Newsletter in time for the membership to propose additional nominees by petition if they so desire.

2) Collect biographical information to accompany the ballots. Assist with actual distribution of ballots to members.

3) Tabulate election results.

4) Notify all candidates of the election results one month prior to the annual meeting.

5) Announce election results at spring meeting of the Executive Board and at a report session for the entire membership at the Annual Meeting.

MEMBERSHIP COMMITTEE

1) Prepare copy for a national membership brochure. Seek approval of the content, format, and cost for such a brochure.

2) Organize a yearly campaign plan for attracting new members. Seek approval from the Executive Board for implementing such a plan.

3) Organize membership drives at our Annual Meeting and as a part of other science education conventions and meetings.

4) Consider the establishment of membership contacts in each state and/or at each major University with graduate programs in science education. Recommend advantage and disadvantage of such a formal membership network.

PLACEMENT COMMITTEE

1) Establish process for listing staff vacancies and characteristics of NARST members seeking employment.

2) Advise Placement Coordinator on the operation of the Placement program.

3) Publicize existence and recommended use of Placement Reports.

4) Arrange for suitable space on Annual Meeting program and at Annual Meeting for Placement functions.

5) Recommend changes in policies regarding Placement services to Executive Board.

REPRESENTATIVES TO OTHER ORGANIZATIONS

1) Represent NARST at Meetings.

2) Recommend projects that have mutual interest between NARST and other organizations.

3) Prepare official reports concerning Board meetings, committee meetings, and other places where NARST is represented for the Executive Board.

CONVENTION EVALUATOR

1) Plan an evaluation of all convention activities in consultation with the Convention Program Chairman.

2) Obtain the necessary assistance from selected association members to conduct the evaluation.

3) Administer the evaluation.

4) Report the results of the evaluation to the Program Committee and the Executive Board.

EDITORS (JRST, Newsletter, Investigations, and Other Special Publications)

1) Execute policies recommended by the Publication Advisory Committee and approved by the Executive Board.

2) Establish guidelines and working relationship with advisory committee and editorial boards concerned with a given publication.

3) Work with printer concerning actual printing and distribution of the publication.

4) Recommend changes to the Publication Advisory Committee, and/or the Executive Board.

EDITORIAL BOARDS

1) Assist with forming and executing policy with respect to a given publication (within guidelines approved by the Executive Board).

2) Support the Editor in his work.

3) Advise editors, Publication Advisory Committee, and the Executive Board concerning policies and problems. Suggest possible changes that will result in improvements.

PRIORITIES FOR RESEARCH IN SCIENCE EDUCATION

A Symposium Presented At
National Association for Research In
Science Teaching

Cincinnati, Ohio
March 23, 1977

IDENTIFYING OUR RESEARCH PRIORITIES

"Priorities for Research in Science Education"
Professor David Butts, William Capie,
Ellen Fuller, David May, James Okey, and
Russell Yeany Jr.

"A Factor Analytical Study of the Research Priorities of Science Educators"
Professor Russell Yeany Jr. and
William Capie

"The Relationships Among Science Educators' Research Priorities and Demographic Variables"
Professor James Okey and Russell Yeany Jr.

PRIORITIES FOR RESEARCH IN SCIENCE EDUCATION

Butts, D., Capie, W., Fuller, E., May, D.,
Okey, J., and Yeany, R.

Department of Science Education
University of Georgia
Athens, Georgia

PRIORITIES FOR RESEARCH IN SCIENCE EDUCATION

David Butts, William Capie, Ellen Fuller,
David May, James Okey, and Russell Yeany Jr.

Department of Science Education
University of Georgia
Athens, Georgia 30602

In April of 1976 the Department of Science Education at the University of Georgia began a study to determine priorities for research in science education. The study was done at the request of the Research Committee of the National Association for Research in Science Teaching (NARST)[1]. The committee had been asked by the Executive Board of NARST to coordinate the study.

The initial impetus for a study of research priorities came from a request by officials at the National Institute of Education for a statement from NARST that outlined the research tasks the members of the organization believed to be most important. However, the need for establishing priorities for research goes beyond the interests of a federal agency in establishing research priorities. College and university science education groups and individual science education researchers periodically need to examine the type of research activities on which they propose to expend their personal or institutional resources.

The purpose of this report is twofold. First, the procedures followed by the University of Georgia research group in obtaining information from NARST members about their priorities for research are presented. The second purpose is to describe the results of the survey by presenting the categories of research proposed by members of the organization and their rankings of them.

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[1]Members of the committee included Stanley Helgeson, Chair (Ohio State University), Edward Smith (Michigan State University), William Torop (West Chester State College), and Paul Koutnik (Illinois Institute of Technology).

The Delphi technique was selected as a means of establishing research priorities among the NARST membership. Delphi is a method for obtaining group judgements on factual matters, which lack precise information, or on values, for which information is a matter of opinion (Sweigert and Schabacker 1974). The value of Delphi in this study rested in its potential to establish a set of science education research priorities from a large group of respondents with diverse opinions and values.

The iterative structure of the Delphi technique is the mechanism which distinguishes it from other group decision-making processes (Skutch and Hall). Participants offer their perceptions and respond in the light of previous actions and feedback from a summary of the judgements of all respondents in previous rounds. According to Sweigert and Schabacker (1974), the process of making successive judgements with feedback reduces the variance in the responses of the respondents. This convergence appears to be greatest on the first round after feedback than on any other subsequent rounds (Cyphert and Gant, 1970).

Procedure:

The format of the study was shaped by the decision to utilize the Delphi technique. Obtaining input from as many NARST members as possible, tabulating that data, and returning this information to assist responders in further defining their research priorities was the study objective. Meeting this objective indicated use of Delphi in a three-phased study procedure.

Before priorities could be established on a series of research topics, the topics themselves needed to be identified. This was accomplished in

Phase I of the study. In May, 1976 each member on the NARST mailing list (N=780) received a description of the study and a form requesting nomination of three "needed areas of research in science education." Responses from 248 persons listed 729 areas of research. Twenty-two forms of the 780 were returned as undeliverable as addressed.

Phase I ended with a categorization of the 729 research area nominations. When the majority of the Phase I nominations were received, generic statements were generated by listing the priorities contained in the individual nominations. When duplicate content occurred, nominations were grouped into categories where appropriate. When a nomination did not fit an established generic category, a new category was written. The result of this analysis was a set of thirty-five statements. A second review of the nominations was then made by another person in which each nomination was categorized by using the thirty-five statements of priority. There was more than a .90 agreement between these two raters. The results of this process are in Table I. The contrast in frequency in nomination is illustrated in the column "Phase I - Initial Nominations." The range of nominations for each statement was from 1 to 59.

In Phase II, the list of 35 generic statements of needed research in science education was also mailed to the 780 persons on the NARST mailing list. Directions for this form requested each person to rate each generic statement on a 1 to 10 priority scale, with one indicating high priority and ten low priority. The 35 statements were listed in a random order. A total of 327 responses (41% of NARST mailing) were returned. The data were analyzed to ascertain the mode, mean, standard deviation, and percentage of respondents selecting each item. A summary of the mean and standard deviation of these data are displayed in Table I.

Since a small number of Phase II responses were received which did not list the name of the responder, further inquiry was made to match response with responder. The number of unusuable responses in Phase II was six.

In Phase III of the study, each respondent from Phase II (N=327) was mailed a copy of the statistics from Phase II, as well as their personal response sheet. Directions asked that respondents " ... reconsider your response in relation to those of your colleagues ... " and again indicate a priority of from one to ten. Of the 327 who received information in this phase, 209 persons responded 64%. Data from Phase III were analyzed in a similar way to Phase II and a summary of that data is contained in Table I.

DISCUSSION

Establishing priorities within groups of professional researchers is not a simple task. The problem is particularly difficult when the alternatives are numerous as in this study. The Delphi technique was suitable for securing maximum input in establishing priorities. As noted, initial suggestions came from 248 persons, nearly 33% of the NARST membership.

The frequency of nominations is itself one way to establish priorities. The number of suggestions for each research area can be seen as an indication of the importance attached to these areas. Numbers of votes may be deceptive, however, for there may be widespread but weak interest. Or individuals may not consider the many possible areas of research. The second round of a Delphi study compensates for both these deficiencies. All nominations are shared with all group members who rate each according to degree of importance. It is interesting to note in Table I that the generic research areas with relatively few nominations (e.g. #7, 8) were

given high ratings in subsequent rounds. On the other hand, two areas with many nominations (e.g. #11, 14) were given lower ratings.

Another important strength of the Delphi techniques is its potential for achieving consensus at Phase III. The results of surveying the NARST membership indicate that there was more agreement on the ratings after Phase III than after Phase II. The variance among the responses decreased from Phase II to Phase III for thirty-two of the thirty-five research areas. In only one case (#30) did the variance increase after Phase II.

A second interesting finding during Phase III was the change in mean ratings. The rating of the 24 highest-rated research areas increased during Phase III. At the same time, the six lowest-rated areas were rated lower at Phase III than at Phase II. In addition to increasing agreement on each item, there appeared to be increasing polarization between high- and low-rated areas.

Examining the 35 research areas creates an almost irresistible urge to identify "the most pressing need" or "highest priority" and to find commonalities among high- or low-rated areas. However, the wisdom of doing either is debatable. The research areas may have been stated in generic terms so broad that it would be difficult to determine what triggered a response in a responder. Also, the measurement error in each case is large enough to prohibit distinctions between priorities of adjacent items ($S_{\bar{x}} \approx .15$). Of course, there is a significant difference between items separated by several ranks in the list.

Recognizing the uncertainty in the task, a few observations are desirable. Perhaps the strongest supported generalization about the priorities is that the practicality and ease of application of the research

product diminishes with the lower rated priorities. The more highly rated research areas were characterized by applying theory to teaching or to learning or by identifying strategies that facilitate teaching or learning. Implicit in both these areas is the potential for changing practice -- in classroom teaching or in teacher education. Developing or testing theory, developing materials, and pursuing interests in specific populations all were ranked low in the list.

This preference for practical or applied research is distinctive and may represent a change in position over the last dozen years. An assessment of change is not possible, however, because priorities of the sixties can only be inferred from the writing of a few (Tyler, 1967; Cooley, 1961; Novak, 1963). This study can provide baseline data in 1986 for determining if priorities have changed in the last decade. Even though this study does not identify the top priority for research in science education, it does indicate which areas are a high priority of the science education research community -- knowledge which should help researchers determine how to devote their energies and resources in the future.

REFERENCES

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Cyphert, F. and Gant, W. The delphi technique: a case study. Phi Delta Kappan, 1971, 52, 5, p. 272-273.

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Skutch, M. and Hall, D. Delphi: potential use in educational planning. Project SIMU-School: Illinois, Chicago component. Chicago Board of Education, July 1973.

Sweigert, R. and Schabacker, W. The delphi technique: how well does it work in setting educational goals. Atlanta, Georgia State Board of Education, April 1974.

Tyler, R. W. "Resources, Models, and Theory in the Improvement of Research in Science Education, Journal of Research in Science Teaching," 5: 43-51, 1967.

TABLE I
Science Education Ranking of Research Categories

Statement Order Based on Final Ranking	Phase III $\bar{X}$	Phase III SD	Phase II $\bar{X}$	Phase II SD	Phase I (Initial Number of Nomination)
1. Application of learning and cognitive development theories to classroom instruction.	2.5	1.6	3.0	2.0	21
2. Analysis of classroom teaching behaviors that facilitate science learning.	2.5	1.9	3.0	2.1	42
3. Identify what elements are essential in translating both research and development activities into classroom practice.	2.7	1.7	3.1	2.1	31
4. Analysis of strategies for acquisition, retention and transfer of problem solving (critical thinking or inquiry skills) in students.	2.7	1.9	3.1	2.1	26
5. Identification and validation of strategies to assist preservice and inservice teachers in acquiring specific teaching skills.	2.9	2.1	3.3	2.2	46
6. Relationship between motivation, attitudes and performance (in both students and teachers).	3.0	2.0	3.5	3.0	48
7. Identification and development of teacher education strategies (inservice and preservice) designed to facilitate professional growth and concerns of teachers, including commitment to continued growth.	3.0	2.1	3.5	2.3	12

TABLE I (continued)

Statement Order	Phase III		Phase II		Phase I
Based on Final Ranking	$\bar{X}$	SD	$\bar{X}$	SD	(Initial Number of Nomination)
8. Identification and validation of teaching behaviors and instructional strategies that facilitate student self-concept, knowledge and attitudes.	3.1	2.2	3.5	2.3	6
9. Identification and validation of specific learner characteristics which relate to successful achievement in science.	3.2	2.0	3.6	2.2	21
10. Definition and validation of goals of science instruction, e.g., balance between process and process objectives, philosophical and theoretical basis of science instruction, articulation of goals for students at all levels, K-16.	3.2	2.3	3.7	2.4	21
11. Identification of factors which influence formation of attitudes in students, e.g., value clarification in environmental education, attitudes toward science and technology.	3.3	2.0	3.5	2.1	59
12. Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials					
-- at junior high or middle school level	3.4	2.1	3.7	2.4	10
13. Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials					
-- at elementary level	3.5	2.1	4.0	2.6	20

TABLE I (continued)

Statement Order Based on Final Ranking	Phase III $\bar{X}$	Phase III SD	Phase II $\bar{X}$	Phase II SD	Phase I (Initial Number of Nomination)
14. Application of learning and cognitive development theories to concept formation.	3.5	2.1	3.9	2.4	63
15. Design of longitudinal studies to identify what kinds of gains are important to a variety of student populations.	3.5	2.2	3.9	2.4	27
16. Development and evaluation of instructional materials which draw from and integrate more fully sciences, social sciences, and mathematics.	3.6	2.1	3.9	2.4	10
17. Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials -- at senior high level	3.7	2.2	4.0	2.4	14
18. Analysis of relationship between discipline (subject matter) structure and cognitive structure of the learner.	3.7	2.2	4.0	2.5	15
19. Identification and validation of alternative evaluation schemes for teachers and pupils.	3.8	2.0	4.0	2.1	17
20. Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials -- at college level	3.8	2.4	4.0	2.6	6

TABLE I (continued)

Statement Order Based on Final Ranking	Phase III $\bar{X}$	Phase III SD	Phase II $\bar{X}$	Phase II SD	Phase I (Initial Number of Nomination)
21. Analysis of decisions related to curriculum implementation -- e.g., choosing, using and evaluating curriculum, including analysis of what science teachers see as key decisions.	4.0	2.0	4.3	2.3	13
22. Identification and design of instructional materials in subject content areas for teachers essential to support successful science instruction.	4.0	2.2	4.3	2.5	14
23. Analysis of effectiveness of instructional systems with specific goals and target populations -- e.g., CBTE, PSI, Open Education, Mastery Learning, etc.	4.1	2.3	4.5	4.3	29
24. Identification of characteristics of a professionally competent and committed teacher.	4.3	2.6	4.4	2.7	23
25. Identification and validation of specific teacher characteristics and knowledge which relate to successful teaching styles using ethnographic approaches.	4.4	2.5	4.4	2.7	2
26. Development and evaluation of instructional materials which are integrated with non-science areas such as reading, language arts, fine arts, etc.	4.5	2.3	4.8	2.5	21
27. Development of alternative instructional strategies for use with learners with special problems--e.g., EMR, bi-lingual, culturally deprived, non-reader, minorities, etc.	4.5	2.4	4.6	2.5	24

TABLE I (continued)

Statement Order Based on Final Ranking	Phase III $\bar{X}$	Phase III SD	Phase II $\bar{X}$	Phase II SD	Phase I (Initial Number of Nomination)
28. Construction of a theory of science instruction.	4.8	3.1	4.9	3.2	8
29. Assessment or impact of non-school experiences on students' knowledge in science, mathematics, social studies, etc.	4.9	2.4	4.9	2.4	8
30. Analysis of residue effects of the NSF supported curriculum developments.	5.3	2.8	5.2	2.3	19
31. Influence of political and technological pressures on science instruction, science teacher needs manpower -- e.g., public attitudes and science enrollments.	5.6	2.4	5.4	2.5	33
32. Identification of management skills needed for maintaining a viable learning classroom environment--e.g., discipline, grouping, bookkeeping skills.	5.6	2.8	5.4	2.8	3
33. Description of current perceptions of middle school, high school and college graduates about the nature of life, matter and energy, about usefulness and desirability of alternative teaching modes and strategies.	5.8	2.3	5.5	3.1	11
34. Analysis of factors which characterize the reluctant science teacher.	6.7	2.8	6.0	2.9	5
35. Comparison of goals of science teaching today with those of 10-20 years ago as viewed by a variety of society's segments--e.g., parents, teachers, students, and teacher educators.	8.1	2.3	7.3	2.6	1

A FACTOR ANALYTICAL STUDY OF THE RESEARCH PRIORITIES OF SCIENCE EDUCATORS

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A FACTOR ANALYTICAL STUDY OF THE RESEARCH PRIORITIES OF SCIENCE EDUCATORS

Introduction

At the 1976 Annual Meeting, the National Association of Research on Science Teaching (NARST) authorized a survey of the research priorities of its membership. A three phase Delphi study was undertaken in the spring and summer of 1976. All NARST members were requested to nominate three areas of high research priority. A total of seven hundred twenty-nine nominations were returned. These specific nominations were classified into thirty-five generic categories describing broad areas of research focus.

A list of the thirty-five generic statements was then distributed to all NARST members with a request to rate each on a priority scale from 1 to 10, with 1 being high priority. Three hundred and twenty-seven responses were received. Measures of central tendency and dispersion were calculated from these data on the priority ratings for each statement. Thus information was then returned to all respondents along with their original ratings. In this final phase, respondents reevaluated their original responses in light of the group ratings. Two hundred and nine science educators returned this information.

The results of this reevaluation in the third phase were the final ratings of research priority. Mean ratings for the thirty-five statements ranged from 2.5 to 8.1. As expected in a Delphi Study the variance of responses decreased in the final round. A second finding in the final round was the increase in rating of high rated statements and a decrease in the rating of low-rated areas.

A problem associated with the interpretation of these results is that the means of the highest rated items were so similar that differences among

the ratings could not be discriminated. A second, and obvious, difficulty in interpreting the results of the study was the large numbers of items rated. The task of comparing so many similar, closely-rated ideas was conceptually difficult, if not fruitless.

Efforts to facilitate interpretation resulted in attempts to reduce the thirty-five areas to a more manageable number. For example, various categorizations were created (i.e. pure vs. applied, classroom strategies vs. less practical, etc.). Each system undoubtedly reflected the biases of its creator. The most defensible and empirically sound means for partitioning the thirty-five priorities into sets was a factor-analytic procedure. The problem addressed in this study was three-fold:

1. to reduce the thirty-five statements to fewer more manageable and interpretable groups
2. to identify factors that exist among the thirty-five areas rated by NARST members
3. to compare the means of the mean priority ratings of statements in the factors identified.

Procedure

The priority ratings given to each item by the respondents were factor analyzed by principal component with iteration factoring. Factor extraction was initially controlled by selecting eigenvalues ≥ 1 and rotating through the use of Varimax procedures. In the initial extraction procedure, no restrictions were set on the number of factors which could develop above an eigenvalue of 1. The factor extraction procedure was then repeated but restricted to the development of six factors, the number of identifiable factors in the intial analysis. In subsequent analyses, the number of factors was restricted to five and then four in order to determine which factors were persistent and maintained their identity.

In order to compare the priority ratings of the factors, the means of all statements within a factor were averaged.

Results

The initial factor analysis resulted in the identification of 6 factors which, together, accounted for 83.7% of the variance in the final rankings of the science education research priorities. The high loading (.40 or greater) statements in each of the six were examined to interpret the nature of the factor. The following factors were named.

FACTOR I, Analyzing and Applying Learning Theory accounted for 36.2% of the total variance. Statements which loaded heavily on this factor relate to applying learning and cognitive development theory to concept formation, analyzing the relationship between subject matter and cognitive structure of the learner, and analyzing problem solving acquisition, retention and transfer skills.

FACTOR II, Conducting Needs Assessments accounted for 15.6% of the total variance. The heavy loading statements in this factor all dealt with needs assessment activities related to curriculum development.

FACTOR III, Social and Educational Pot Pouri accounted for 11.2% of the total variance. A variety of statements loaded heavily on this factor. These included an historical comparison of science teaching goals, the influence of political pressure on science instruction, characterizing the reluctant science teacher, analyzing the effects of the NSF.

FACTOR IV, Determining the Effects of Teaching and Attitudes on Learning accounted for 8.3% of the variance and included statements about researching teaching behaviors that facilitate science learning, identifying the characteristics which predict successful achievement in science.

FACTOR V, Developing and Evaluating Interdisciplinary Curricula accounted for 5.9% of the variance and was composed of two statements on developing and evaluating instructional materials.

FACTOR VI, Validating Teacher Training Strategies accounted for 6.5% of the total variance. Heavy loading statements in this factor related to the identification and validation of science teacher education strategies to assist in the preservice and inservice acquisition of teaching skills.

When the total number of factors which could develop was limited to six, the nature of Factor V changed somewhat because of a shift in the statement loadings. When only five factors were allowed to develop, Factor VI disappeared and the statements in it loaded on several other factors. The five factors which remained (I, II, III, IV and V) were identifiable in both the intial analysis and the six-factor limited analysis.

Table 1 is a list of the five factors from the restricted analysis with the statements which compose them and their factor loadings. The mean of the mean ratings of all statements within a factor are included as the left column.

Conclusions

The purposes of this factor analytical study were to reduce the thirty-five statements to more manageable and interpretable science education research priorities and to compare the mean priority ratings of the factors identified.

There does appear to be some difference in the priority ratings of the factors when the mean ratings of statements within a factor are averaged. An inspection of Table 1 reveals the highest research priority (3.18) as viewed by the membership of the NARST is represented by Factor IV--DETERMINING THE EFFECTS OF ATTITUDES AND TEACHING ON LEARNING. ANALYZING AND APPLYING LEARNING THEORY (Factor I) and CONDUCTING SCIENCE CURRICULUM NEEDS ASSESSMENTS

(Factor II) are essentially tied for number two priority with mean ratings of 3.41 and 3.42. INTERDISCIPLINARY CURRICULUM DEVELOPMENT AND EVALUATION (Factor IV) was rated as a slightly lower priority (4.05).

Factor III--SOCIAL AND EDUCATIONAL POT POURI--is an interesting and somewhat undefineable set of statements. The seven heavy loading statements do not seem to possess any easily conceptualized relationship. The fact that the priority rating of the factor is the lowest of the five (5.35) is probably a clue to the identity of the factor. That is, unlike the other factors which seem to be composed of statements related to a common research theme, Factor III represents a composite of low priority research areas in science education as perceived by the NARST membership.

The factor analytical procedures employed in this study proved to be very useful in the process of reducing and discriminating among many over-lapping priority ratings. The five factors are much easier to conceptualize than the 35 research priority statements as a whole.

The identification of these factors with their mean priority ratings should provide a basis for decisions related to the commitment of resources in future science education research.

TABLE 1

The Thirty-five Science Education Research Priorities As They Loaded On Five Factors Identified Through Restricted Factor Analysis Procedures

FACTOR I ANALYZING AND APPLYING LEARNING THEORY

Mean Factor Rating	Factor Loading	Statements
	.78	Application of learning and cognitive development theories to concept formation.
	.65	Analysis of relationship between discipline (subject matter) structure and cognitive structure of the learner.
	.63	Analysis of strategies for acquisition, retention and transfer of problem solving (critical thinking or inquiry skills) in students.
	.59	Construction of a theory of science instruction.
	.58	Application of learning and cognitive development theories to classroom instruction.
$\bar{\bar{X}}$ = 3.41	.41	Identification of factors which influence formation of attitudes in students, e.g., value clarification in environmental education, attitudes toward science and technology.
	.39	Definition and validation of goals of science instruction, e.g., balance between process and process objectives, philosophical and theoretical basis of science instruction, articulation of goals for students at all levels, K-16.
	.38	Identification and design of instructional materials in subject content areas for teachers essential to support successful science instruction.
	.36	Identification and development of teacher education strategies (inservice and preservice) designed to facilitate professional growth and concerns of teachers, including committment to continued growth.

FACTOR II CONDUCTING NEEDS ASSESSMENTS

Mean Factor Rating	Factor Loading	Statements
	.90	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at junior high or middle school level.
	.81	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at elementary level.
$\bar{\bar{X}}$ = 3.42	.75	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at senior high level.
	.60	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at college level.
	.37	Identify what elements are essential in translating both research and development activities into classroom practice.

TABLE 1 Continued

FACTOR III SOCIAL AND EDUCATIONAL POTPOURRI

Mean Factor Rating	Factor Loading	Statements
	.58	Comparison of goals of science teaching today with those of 10-20 years ago as viewed by a variety of society's segments--e.g., parents, teachers, students, and teacher educators.
	.54	Analysis of residue effects of the NSF supported curriculum developments.
	.48	Analysis of factors which characterize the reluctant science teacher.
	.47	Influence of political and technological pressures on science instruction, science teacher needs manpower--e.g., public attitudes and science enrollments.
	.46	Analysis of effectiveness of instructional systems with specific goals and target populations--e.g., CBTE, PSI, Open Education, Mastery Learning, etc.
	.43	Identification of management skills needed for maintaining a viable learning classroom environment--e.g., discipline, grouping, bookkeeping skills.
$\bar{\bar{X}} = 5.35$	.41	Description of current perceptions of middle school, high school and college graduates about the nature of life, matter and energy, about usefulness and desirability of alternative teaching modes and strategies.
	.33	Identification and validation of alternative evaluation schemes for teachers and pupils.
	.28	Analysis of decisions related to curriculum implementation--e.g., choosing, using and evaluating curriculum, including analysis of what science teachers see as key decisions.
	.27	Development of alternative instructional strategies for use with learners with special problems--e.g., EMR, bi-lingual, culturally deprived, non-reader, minorities, etc.

FACTOR IV DETERMINING THE EFFECTS OF ATTITUDES AND TEACHING ON LEARNING

Mean Factor Rating	Factor Loading	Statements
	.60	Relationship between motivation, attitudes and performance (in both students and teachers).
	.60	Analysis of classroom teaching behaviors that facilitate science learning.
	.50	Identification and validation of specific teacher characteristics and knowledge which relate to successful teaching styles using ethnographic approaches.
	.44	Identification and validation of teaching behaviors and instructional strategies that facilitate student self-concept, knowledge and attitudes.
$\bar{\bar{X}} = 3.18$	.40	Identification of factors which influence formation of attitudes in students, e.g., value clarification in environmental education, attitudes toward science and technology.
	.39	Identification and validation of strategies to assist preservice and inservice teachers in acquiring specific teaching skills.
	.38	Identification of characteristics of a professionally competent and committed teacher.
	.37	Design of longitudinal studies to identify what kinds of gains are important to a variety of student populations.
	.26	Assessment or impact of non-school experiences on students' knowledge in science, mathematics, social studies, etc.

FACTOR V DEVELOPING AND EVALUATING INTERDISCIPLINARY CURRICULA

Mean Factor Rating	Factor Loading	Statements
$\bar{\bar{X}} = 4.05$	.73	Development and evaluation of instructional materials which draw from and integrate more fully sciences, social sciences, and mathematics.
	.71	Development and evaluation of instructional materials which are integrated with non-science areas such as reading, language arts, fine arts, etc.

THE RELATIONSHIPS AMONG SCIENCE EDUCATORS' RESEARCH PRIORITIES AND DEMOGRAPHIC VARIABLES

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THE RELATIONSHIPS AMONG SCIENCE EDUCATORS' RESEARCH PRIORITIES AND DEMOGRAPHIC VARIABLES[1]

At the request of the Research Committee of the National Association for Research in Science Teaching (NARST), a study[2] was conducted to determine the priorities for research among science educators. In a mail survey, the 780 members of NARST were asked to nominate, "needed areas of research in science education." The nominations from NARST members were classified into 35 generic research statements. In a second phase of the study, the statements were mailed back to all NARST members who were asked to rate each statement on a 1 (high) to 10 (low) priority scale. NARST members were also asked to complete a demographic questionnaire that included such items as the amount of research training they had, their research productivity, and the type and size of their institutions. In a third phase of the study, all respondents from the second phase were provided with summary statistics (central tendency and dispersion data) from the initail rating of the 35 research statements and asked to rerank them in light of the collective response of the members. A complete description of the procedures followed in this study of research priorities can be found in a report by Butts, et. al. (1977).

The purpose of this paper is to analyze data from the NARST research priority study to identify relationships among the selected demographic variables covered by the questionnaire and the priority ratings given to the research statements. The analysis will allow a determination of possible links between such variables as the amount of research training and research productivity,

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[1] A paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Cincinnati, Ohio, March, 1977.

[2] The study was conducted at the University of Georgia. Participants included David Butts, William Capie, Ellen Fuller, David May, James Okey and Russell Yeany.

between institution size and proportion of time spent on research, or between the importance attached to basic or applied research and the rating of the research statements. The information that can be obtained has value in a variety of ways such as planning graduate programs, predicting the productivity of researchers with various assignments, or determining the degree to which persons with different training agree on the research work important in their field. Perhaps most important though, is the fact that the data say something about members of the NARST organization--the relationships among what their jobs are, the type and amount of research work they complete, and what they think are important research tasks that need attention.

PROCEDURES AND OUTCOMES

Sample

An up-to-date NARST membership list (April, 1976) was used to select participants for this survey study.[3] Of the 780 NARST members receiving the initial mailing, a total of 327 (42%) completed the second phase. A total of 209 members (64% of the phase II respondents and 27% of those in the original list) completed the third phase of the study. It was decided that the demographic data provided in phase II and the rating of the research statements from phase III would provide the data from which the correlations for this study would be produced. Phase III research ratings were used because they represented the final decisions of the respondents. This led to a total of 198 usable responses (95% of the persons completing phase III of the study and 25% of the NARST members) for generating the data for this study.

[3] Because the study was to be completed in a short time, only U. S. and Canadian members of NARST were surveyed.

Demographic Data

The demographic information provided by NARST members consisted of responses to a 20-item questionnaire. Table 1 gives a brief description of the items on the questionnaire and a short summary of the data provided for each variable. In Table 2 the correlation matrix for the 20 demographic variables is given.

Ranking of Research Statements

A complete listing of the 35 generic research statements that were rated by the NARST members is available elsewhere (Butts, et.al., 1977). Table 3 shows the ten statements from that list that received the highest research priority in the survey and the five that received the lowest priority. Table 4 provides the correlations of the 20 demographic variables with these 15 statements.

SUMMARY[9]

Demographic Data

A summary of the information provided by the 198 respondents is as follows:

- about 75% have completed 3 or more research classes
- about 50% have 6 or more years of experience
- about 60% have no time budgeted for research
- about 10% have more than 1/4 of their time for research
- about 30% have no published research articles or papers
- about 50% have none or 1 research article published in the last 5 years
- about 13% averaged 1 published research article per year over the last 5 years, the remainder published less than this
- about 40% have some instructional responsibilities for research design courses

[9] It is important to keep in mind that this summary is based on information from 198 of the 780 members on the NARST mailing list. It is not known how accurately these results reflect the background and views of the 582 members not included here.

TABLE 1

Demographic Data From NARST Members (n=198)

VARIABLE	DESCRIPTION	INFORMATION
1	Amount of research training	2% had no training, 19% had 1 or 2 courses, 79% had 3 or more
2	Amount of research experience	18% had 2 years or less, 25% from 3 to 6, 56% had 6 or more
3	Type of institution	87% teach in public institutions
4	Enrollment of institution	32% are less than 10,000; 41% are more than 20,000
5	% of job: undergraduate science teaching	70% have none, average of 45% for the others
6	% of job: undergraduate teacher training	42% have none, average of 46% for the others
7	% of job: graduate science education	44% have none, average of 30% for the others
8	% of job: research	62% have none, average of 25% for the others
9	% of job: administration	59% have none, average of 30% for the others
10	research studies completed past 5 years	31% have 0 or 1, 40% have 2 to 5, 28% have 5 or more, overall mean of 2.1
11	research papers given past 5 years	41% have 0 or 1, 43% have 2 to 5, 16% have 5 or more, overall mean of 1.8
12	research articles published past 5 years	49% have 0 or 1, 37% have 2 to 5, 13% have 5 or more, overall mean of 1.7
13	# of career research studies	mean response is 8.2, mode is 1, 12% have none
14	# of career research papers	mean is 7.6, mode is 2, 25% have none
15	# of career research articles	mean is 7.8, mode is 2, 30% have none
16	portion of time budgeted for research	62% have no time, 27% have 25% or less, 11% have 26% or more
17	importance of applied research	mean rank of 2.1 on 1 (high) to 4 (low) scale, highest rank of items 17-20
18	importance of dissemination	mean rank of 2.7
19	importance of development	mean rank of 2.3
20	importance of basic research	mean rank of 2.9, lowest rank on items 17-20

TABLE 2

Correlation Matrix[4] For Demographic Variables[5]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	--	-.12	-.04	.10	.07	-.18	-.08	.22	-.02	.15*	.18*	.08	.13	.16	.04	.18*	-.11	.12	.11	-.11
2		--	-.09	.01	-.30*	-.26*	-.04	-.14	-.03	.16*	.14	.17*	.09	.05	.07	.05	-.06	.08	-.13	.03
3			--	-.19*	.07	-.15	.25*	.25*	-.18*	-.04	-.04	-.10	.20*	-.08	-.01	.05	.09	-.12	.06	.02
4				--	-.02	-.11	.15	.15	.06	.22*	.19*	.21*	.22*	.24*	.23*	.20*	-.04	.06	.02	-.01
5					--	-.06	.17	-.02	-.24	-.18	-.14	.01	-.33*	-.24	-.11	-.03	-.16	-.16	.14	.07
6						--	-.20*	-.10	-.37*	-.26*	-.15	-.28*	-.34*	-.18	-.18	-.27	.13	-.06	-.09	.03
7							--	.30*	-.02	.04	.06	.02	.01	-.02	.14	.01	-.17	.08	.02	-.01
8								--	.01	.28*	.26*	.19	.34*	-.03	.15	.69*	-.28*	.22	.21	-.25*
9									--	-.05	-.12	-.10	-.12	-.12	-.04	-.10	.01	.10	-.23	.09
10										--	.61*	.58*	.41*	.28*	.37*	.34*	-.22*	.24*	.04	-.06
11											--	.56*	.26*	.46*	.40*	.22*	-.15*	.25*	.03	-.11
12												--	.30*	.20*	.30*	.30*	-.24*	.22*	.05	-.08
13													--	.45*	.46*	.30*	-.07	.01	.12	.03
14														--	.74*	.01	.05	.06	.07	.01
15															--	.02	.07	.08	.07	.03
16																--	-.23*	.09	.08	-.03
17																	--	-.36*	-.21*	-.17*
18																		--	-.17*	-.48*
19																			--	-.53*
20																				--

*p<.05

[4]For this Table and Table 4 different numbers of cases were used in calculating the coefficients. As a result, the same coefficient may or may not reach the selected significance level.

[5]See Table 1 for a description of each numbered variable.

TABLE 3

Research Statements Receiving The Highest And Lowest Ratings

Rank order	Mean rating on 1-10 scale[6]	Research Statement
1	2.5	Application of learning and cognitive development theories to classroom instruction.
2	2.5	Analysis of classroom teaching behaviors that facilitate science learning.
3	2.7	Identify what elements are essential in translating both research and development activities into classroom practice.
4	2.7	Analysis of strategies for acquisition, retention and transfer of problem solving (critical thinking or inquiry skills) in students.
5	2.9	Identification and validation of strategies to assist pre-service and inservice teachers in acquiring specific teaching skills.
6	3.0	Relationship between motivation, attitudes and performance (in both students and teachers).
7	3.0	Identification and development of teacher education strategies (inservice and preservice) designed to facilitate professional growth and concerns of teachers, including commitment to continued growth.
8	3.1	Identification and validation of teaching behaviors and instructional strategies that facilitate student self-concept, knowledge and attitudes.
9	3.2	Identification and validation of specific learner characteristics which relate to successful achievement in science.
10	3.2	Definition and validation of goals of science instruction, e.g., balance between process and process objectives, philosophical and theoretical basis of science instruction, articulation of goals for students at all levels, K-16.
31	5.6	Influence of political and technological pressures on science instruction, science teacher needs manpower--e.g., public attitudes and science enrollments.
32	5.6	Identification of management skills needed for maintaining a viable learning classroom environment--e.g., discipline, grouping, bookkeeping skills.
33	5.8	Description of current perceptions of middle school, high school and college graduates about the nature of life, matter and energy, about usefulness and desirability of alternative teaching modes and strategies.
34	6.7	Analysis of factors which characterize the reluctant science teacher.
35	8.1	Comparison of goals of science teaching today with those of 10-20 years ago as viewed by a variety of society's segments--e.g., parents, teachers, students, and teacher educators.

[6]Ratings have been rounded to the nearest tenth.

TABLE 4

Correlations of Demographic Variables with Research Statements of Highest and Lowest Priority Ranking[7]

Demographic Variables[8]	1	2	3	4	5	6	7	8	9	10	31	32	33	34	35
1	-.08	-.02	-.06	-.07	-.01	.07	.16*	.02	-.10	.05	.09	-.02	.02	.05	.12
2	.01	.01	.08	.06	-.01	.15*	.01	.13	.04	.08	-.07	.05	-.06	-.05	-.18*
3	.04	.01	.04	.12	.14*	.11	.11	.03	.09	-.07	.01	.06	-.07	.15*	.01
4	.02	.06	.14	.01	.05	.09	-.03	-.04	.05	.13	-.01	-.15	-.01	.01	-.08
5	-.13	.07	-.02	-.20	.13	-.28*	.25*	.04	-.13	-.10	-.32*	-.07	.01	.11	.04
6	-.02	-.14	-.17	-.01	-.19*	-.11	-.21*	-.04	-.09	-.23*	-.07	-.12	-.01	-.05	-.02
7	.05	.08	-.07	.09	.05	.01	-.05	-.26*	.14	-.15	-.25*	.10	-.13	.03	-.02
8	.26*	.20	.14	.37*	.43*	.37*	.55*	.29*	.12	-.07	.12	-.01	.17	.23*	-.03
9	.08	-.17	-.09	.23*	-.07	-.07	-.12	-.07	-.03	.01	-.23*	-.13	-.12	-.04	-.08
10	.01	-.02	.01	.06	.04	.04	.10	.08	.06	.12	.04	.05	.02	-.05	-.01
11	-.06	-.01	.03	.05	-.06	.08	.06	.08	.10	.08	-.01	.12	-.02	.02	-.01
12	-.03	.04	.01	-.11	.05	.17*	.07	.14	-.04	.10	-.02	.09	.05	.01	-.06
13	.18*	.10	.11	.19*	.28*	.05	.24*	.18*	.08	.18*	.02	.02	.05	.07	-.05
14	-.01	-.02	.04	.08	.05	-.02	.03	.02	-.03	.24*	-.05	-.10	-.02	-.01	-.01
15	.08	.05	.09	.20*	.15	-.01	.12	.05	-.09	.27*	-.16	-.01	.05	-.04	-.07
16	.05	.12	.09	.12	.24*	.24*	.24*	.13	.10	.05	.14*	.11	.12	.17*	.02
17	-.01	.02	-.01	-.03	-.01	.06	-.10	-.09	-.05	-.03	.05	.03	-.13	-.01	.06
18	-.03	.02	-.01	.04	.07	.03	.09	.07	.06	.05	.01	-.01	.04	.06	-.08
19	-.03	-.08	.12	-.11	.10	-.01	.13	.10	-.10	-.05	.02	.08	.16*	.05	.04
20	.07	.05	-.06	.10	-.09	-.08	-.08	-.07	.08	.05	-.05	-.10	-.07	-.13	-.02

*$p<.05$

[7] See Table 3 for a listing of the top ten and bottom five research statements.

[8] See Table 1 for a description of each numbered variable.

Correlations Among Demographic Variables

A total of 65 significant ($p<.05$) correlation coefficients are shown in Table 2. Among the findings of interest are:

- The number of research studies (#10), research papers (#11), and research articles (#12) completed in the past 5 years correlated significantly with 13, 11, and 11 other demographic variables, respectively. This is the largest block of significant correlations on the chart.

- The portion of time budgeted for research (#16) correlated significantly with 9 other variables. These range from a negative correlation with the importance of applied research (#17) to a high positive correlation with the portion of time devoted to teaching research classes (#8). Significant positive correlations were found with each of the three measures of recent productivity (#10, 11, 12).

- The portion of time devoted to undergraduate teacher training (#6) correlated significantly with 7 other variables and each was negative. This included two of the three measures (#10, 12) of recent research productivity.

- The amount of research training (#1) correlated significantly with recent research productivity (#10, 11) and with the amount of time budgeted for research (#16).

- The enrollment of the institution at which one works (#4) has a significant relationship with 8 other variables including positive correlations with the 6 measures of recent (#10, 11, 12) and career (#13, 14, 15) productivity.

Ranking of Research Statements

The research statements receiving the highest and lowest priority rankings (see Table 3) deal with a variety of research topics.

- 5 of the top ten statements describe research associated with teaching behaviors or teaching strategies. Three of these are concerned with identifying teaching skills that influence student learning (#2, 4, 8), the other two are concerned with effective means of teacher education (#5, 7).

- 2 of the top statements (#1, 3) describe studies that involve applying theory and research to classroom practice.

- 2 of the top statements (#6, 9) describe studies that would seek relationships among teacher and student variables (e.g., attitudes, motivation, and performance).

- the five research statements with the lowest ratings each deal with a status survey calling for a descriptive, analytical, or comparative study.

Another report (Yeany and Capie, 1977) examines the relationships among the ratings of the research statements in greater detail using factor analysis procedures.

Correlations of Demographic Variables and Research Ratings

A total of 38 significant correlations ($p<.05$) are shown in Table 4 among the 300 correlations calculated.

- the percentage of one's job devoted to teaching research classes (#8 in Table 1) and the portion of time budgeted for research (#16) account for 7 and 5 of the significant correlations, respectively. Each of these is a positive correlation which means that NARST members with the most research teaching and time tended to give the statements a lower priority than persons with low research responsibilities.

- the number of career research studies (#13) correlated (significantly) with the rating of 6 of the research statements. Again each correlation is positive indicating that persons with high productivity tended to give the statement a low priority rating.

- The highest correlations in Table 4 are for the relationship between the percentage of one's job devoted to teaching research classes (#8) and the ratings of statements #5 (.43) and #7 (.55). These are the two statements that deal with effective means of teacher education.

- The three measures of recent research productivity (#10, 11, 12) yield only 1 significant correlation with the rating of the top ten or bottom five research statements.

CONCLUSIONS

Despite the fact that NARST members belong to a research association, they appear as a group for whom research is not a major activity. A full 60%

of the NARST respondents have no budgeted research time and only one-fourth of the remaining 40% have as much as 25% time for research. Over the last five years they averaged about .35 research articles per year or an average of 1 published research article every three years.

The significant correlations among the demographic variables are all of moderate to low magnitude. The highest correlations in the matrix are for the intercorrelations among the several measures of recent and career research productivity (e.g., .74, .61, .58) as would be expected. The remaining correlations hover around the .20 to .30 range, hardly a size on which to base predictions.

The research statements receiving the highest rankings of NARST members emphasize the acquisition and influence of teaching strategies or behaviors, applying theory and research to classroom practice, and relationships among teacher and student variables. Research statements with the lowest rankings tend to emphasize survey research studies.

The relatively few significant correlations between the demographic variables and the ratings of the research statements indicate the broad based support for those activities with the highest research priority. A large number of either high positive or high negative correlations would have indicated a polarity among NARST members associated with such factors as amount of training, measures of productivity, or years of experience. This was not found. Instead there were few significant correlations and these were of only moderate magnitude.

Positive correlations predominate among those which are statistically significant in Table 4 (demographic variables with ratings of research statements). This means that there is some difference in the priorities for research among NARST members based on their time devoted to teaching and conducting

research. Positive correlations mean that persons with small amounts of time for teaching and conducting research tended to give the statements lower ratings (higher priority) and vice versa. Both the small number of significant correlations and their relatively small magnitude make this an important but not overwhelming conclusion.

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A Study of the Research Priorities as Perceived by Public School Science Personnel

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A Study of the Research Priorities as Perceived by Public School Science Personnel

Introduction

The influence of science education research on classroom teaching practice is not as great as many would like it to be. This lack of influence may be due to a number of reasons. Many feel that research findings and their implications are inadequately communicated to classroom teachers. However, this lack of influence may also be due to the perceived lack of relevance for teachers as they look for guidance to deal with daily concerns and decisions faced in the classroom. A mechanism needs to be designed to facilitate the identification by teachers of research problems relevant to teachers needs.

Recently the National Association for Research in Science Teaching (NARST) and the National Science Teachers Association (NSTA) supported a cooperative effort designed to increase the influence of classroom science teachers on science education research and to improve teachers perception of the relevancy of science education research. This should serve to establish better credibility of researchers with teachers and of teachers with researchers thus making the impact of research on classroom practice more likely. A major objective of this effort was stated as follows:

> To obtain input from teacher identifying relevant research questions related to classroom practice.

This report includes the processes, initial results, and planned future activities and procedures related to the above objective.

Procedures

A question to solicit teachers' suggestions for needed research related to classroom practice was drafted by the Research in Science Teaching Committee (NSTA)

and included in a questionnaire sent to participants in the monograph-seminar series sponsored by NSTA. The seminars are the mechanism for dissemination of the information in the monograph: What Research Says to the Science Teacher (Rowe, 1978). The following question was responded to by 145 science teaching personnel:

> "Based on your teaching experiences, what kinds of research related to classroom teaching practices would you like to see done?"

Data were also collected from each participant on the position, content area, experience, community type, and rankings of the six research topics presented at the seminar. One-hundred and thirty-seven usable sets of data were returned to the NSTA headquarters. The responses to the research question were examined by a panel of four science educators who classified them into logical factors based on the majority opinion of the panel.

The demographic topic ranking and the category of the research response data were analyzed to determine frequency, central tendency, and dispersion characteristics. Also, the demographic information was compared to the topic rankings and type of research response through forward stepwise regression analysis to determine the order and set of teacher variables which predicted the greatest amount of variance in the research and ranking responses.

Results

Results from data analysis on the demographic characteristics of the respondents are given in Table 1. As can be noted, the majority (62%) were males; fifty percent held teaching positions; while, forty-eight percent had department head duties. About half taught biology (45%) and/or chemistry (46%); twenty-two percent taught physical science. Most of the participants (94%) had more than five years experience; while, fifty-two percent had more than

Table 1

Demographic Information on Participants in the NSTA Research Seminar who Responded to the Inquiry on Science Education Research Priorities

VARIABLE		f	%
SEX	Males	85	62
	Females	52	38
POSITION	Teacher	68	50
	Department Chairman	66	48
	Science Coordinator	21	15
	Administrator	3	2
	Other	3	2
CONTENT AREA	Biology	62	45
	Chemistry	63	46
	Earth Science	17	12
	General Science	21	15
	Physical Science	30	22
	Physics	35	26
EXPERIENCE	1 - 5 years	8	6
	5 - 10 years	25	18
	10 - 15 years	33	24
	> 15 years	71	52
COMMUNITY TYPE	Small Town	23	17
	Rural	5	4
	Small City	38	28
	Large City	57	42
	County	3	2
	Other	1	<1

fifteen years experience. Large and small cities were represented by most of the participants (42% and 28% respectively).

The interest rankings of the Research Seminar topics are presented as Table 2. The highest degree of interest was registered for the topic on teaching strategies effectiveness with the least interest shown in reading and language development through science. Other rankings can be examined in Table 2.

As was mentioned earlier, the research concerns of the participants were classified into logic factors by a panel of reviewers. This process resulted in 12 identifiable areas of research concern which are presented as Table 3. As can be noted, the category represented by the most responses (22%) relates to the influences of science classroom experiences on cognitive achievement. The other response categories, their frequency of representing statements, and percent of total can be examined in Table 3.

The stepwise multiple regression indicated that there was no strong set of demographic variables which can be used to predict research topic ranking or research concerns. In six cases, there was no single significant predictor. In the other cases, three or four demographic variables predicted small amounts of variance. On the average, four demographic variables accounted for twenty percent or less of the variance on the ranking and concerns (see Tables 4 and 5).

Planned Procedures

Further research on the research concerns of science teachers is needed and planned. First, the data collected through the NSTA research seminars are not representative of the science teacher population because it does not include elementary teachers. Second, no priorities can be set on the research statements because the individuals submitted their own concern but did not examine it in

Table 2

Interest Rankings of NSTA Research Seminar Participants on the Seminar Topics (n = 137)

TOPIC	RESPONSES* 1 f	%	2 f	%	3 f	%	4 f	%	5 f	%	6 f	%	$\bar{x}$	MODE	S.D.
How Teaching Strategies Affect Students: Implications for Teaching Science	(52)	38	(40)	29	(21)	15	(12)	9	(7)	5	(4)	3	2.20	4	1.35
The Role of the Laboratory in Secondary School Science Programs	(44)	32	(33)	24	(20)	15	(16)	12	(10)	7	(12)	9	2.60	1	1.65
Learning Science from Planned Experiences	(7)	5	(22)	16	(32)	23	(24)	18	(31)	23	(18)	13	3.70	3	1.54
Relating Student Feelings to Achievement in Science	(10)	7	(24)	18	(22)	16	(33)	24	(24)	18	(22)	16	3.70	4	1.58
Analyzing the Questioning Behaviors of Science Teachers	(13)	10	(7)	5	(20)	15	(32)	23	(35)	26	(28)	20	4.07	5	1.59
Science: A Basic for Language and Reading Development	(12)	9	(8)	6	(19)	14	(17)	12	(28)	20	(51)	37	4.37	6	1.72

*1 = most interested, 6 = least interested

Table 3

Research Concerns of Secondary Science Teachers as Classified by a Panel of Science Educators

RESPONSE CATEGORIES	f	%
1. Research on the influence of science classroom experiences on cognitive achievement.	20	22
*Examples:**		
How teaching strategies affect student achievement		
Which teaching methods work best for certain basic concepts? Lecture, lab, inquiry, rote, LAPS, etc.		
Research related to productivity of various patterns of interaction between teachers and students		
2. Research on the effects of teaching science in the interdisciplinary dimension as it relates to areas such as mathematics, social studies, and reading.	13	15
Examples:		
The relationship between using calculators in science class and an improvement in mathematical ability		
Relationship between math skills and science achievement		
Improving reading and language skills while teaching science		
The most effective methods to approach social issues in science		
3. Research on motivational techniques that relate to learning and continue involvement in science.	12	13
Examples:		
Research related to promising practices in teaching science to reluctant learners		
Techniques which generate enthusiasm in all students		
Ways of encouraging more students to take upper level courses		
4. Research on the effectiveness of laboratory experiences in the science classroom.	11	12
Examples:		
The effect of traditional lab experiences versus those involving inquiry		
Detailed look at benefits of laboratory science		
Use of safe practices in a laboratory experience		
5. Research on the influences of science classroom experiences on pupil attitudes.	11	12
Examples:		
Evaluation of importance of supplementary science experiences and their effect on attitude development		
Relationship of classroom management techniques to student feelings about science		
A correlation between "hand-on" or cognitive experiences and attitudes toward science in general		

Examples of the teacher statements are included for clarification.

Table 3 (continued)

RESPONSE CATEGORIES	f	%
6. Research on the selection and sequencing of science content in the curriculum. *Examples:* Knowledge versus process: finding a balance in science instruction Effectiveness of sequencing of science courses (e.g., biology, chemistry, physics) Effectiveness of various science programs such as unified science	10	11
7. Research on the relationship of student cognitive development and learning styles to science curriculum development and teaching. *Examples:* Matching students' cognitive development to the teaching methods Learning styles of students and related effective teaching strategies Ways to identify the learning needs of students	9	10
8. Research on the effectiveness of supplementary science experiences (e.g., projects, clubs). *Examples:* Effects of student science projects on learning scientific principles and application of scientific methods to everyday situations Effectiveness of clubs and science fairs in teaching science Assisting students with the methods and procedures of project work	7	8
9. Research on and development of valid and reliable science testing and grading procedures. *Examples:* Pass - fail versus A - F grades Development of reliable evaluative instruments to measure effectiveness of science instruction (content and process) Effects of evaluation (grading) on student learning	6	7
10. Research on the influence of public school science experiences on success in college science courses. *Examples:* The retention of scientific facts from high school to college Various learning systems versus student success in college science courses Research which analyzes the forms of science education and correlates them to the success of the students in college	6	7

Table 3 (continued)

RESPONSE CATEGORIES	f	%
11. Research on effectiveness of individualized learning activities in science classes. *Examples:* Effects of individualized learning versus group pacing Effects of total contract courses versus lecture and exams How to manage idividualized laboratory programs	4	4
12. Research on the influence of teacher characteristics on pupil learning and attitudes. *Examples:* How the teacher's personality affects classroom learning Correlation between teachers' attitudes toward science and students' attitudes	3	3

Table 4

Results of Step-Wise Regression to Predict Ranking of Research Seminar Topic from Demographic Information

Dependent Variable	Demographic Predictor	Multiple R	Multiple R^2	r
How Teaching Strategies Affect Students: Implications for Teaching Science				NS
The Role of the Laboratory in Secondary School Science Programs	General Science	.25	.06	.25
	Biology	.33	.11	-.19
	Science Coordinator	.38	.15	.22
	Other	.42	.18	.19
	Large City	.45	.20	.13
Learning Science from Planned Experiences				NS
Relating Student Feelings to Achievement in Science				NS
Analyzing the Questioning Behaviors of Science Teachers	Other	.20	.04	-.19
	Biology	.24	.06	.16
	Earth Science	.29	.08	-.10
Science: A Basic for Language and Reading Development	Coordinator	.23	.05	-.23
	Earth Science	.26	.07	-.11
	Department Chairman	.31	.09	-.01
	General Science	.33	.11	-.13

Table 5

Results of Stepwise Regression to Predict Nature of Research Concern from Demographic Information

RESEARCH CATEGORY	DEMOGRAPHIC PREDICTOR	MULTIPLE R	MULTIPLE R^2	r
1*	Experience	.23	.05	.23
	Department Chairman	.32	.10	-.13
	Other	.40	.16	-.15
	Biology	.43	.18	-.19
	Chemistry	.46	.21	-.05
2				NS
3				NS
4	Earth Science	.25	.06	.25
	Chemistry	.33	.11	.20
	General Science	.41	.16	.21
	Rural	.46	.21	.17
5	General Science	.31	.09	.31
	Large City	.35	.12	-.13
	Chemistry	.38	.14	-.20
	Biology	.41	.17	-.20
	Experience	.44	.19	-.15
6				NS
7	County	.31	.10	.31
	Teacher	.40	.16	-.28
	Physics	.48	.23	.21
8	County	.36	.13	.36
	Small City	.41	.17	.18
	Physics	.45	.20	.18
	Science Coordinator	.48	.23	.09
	Experience	.50	.25	-.14
9	Other	.25	.06	.25
	Large City	.32	.10	.12
10	Rural	.26	.07	.26
	Physics	.35	.12	.21
	Small Town	.38	.14	.15
11	Other	.34	.12	.34
	Earth Science	.43	.19	.23
	Science Coordinator	.46	.21	-.10
12	Rural	.39	.15	.39

* Numbers reference Table 3

light of the full set of concerns.

In relation to the first short-coming, data are now (Winter, 1979) being collected from elementary teachers at selected sites in 9 states (Georgia, Pennsylvania, Michigan, Ohio, Florida, Kansas, Iowa, California and New York). These data will be analyzed and classified by using the same procedures followed with the secondary data.

In relation to the need for prioritizing the research concerns, procedures are planned to solicit a representative sample of science teachers from the NSTA, 1979, National Convention in Atlanta. These individuals will be asked to provide a limited amount of demographic data and then rank the 12 categories of research concerns given in Table 3 as to high or low priority on a scale of 1 - 10.

Conclusions

Any conclusions drawn at this time would be premature and extremely tentative; therefore, statements of inference are being withheld until the data set is more complete and more organized in relation to priorities. At that time the results of the study will be compared to the research priorities of science education researchers as determined by the NARST priorities study (Table 6) and efforts will be made to use these results to guide the practice and funding of research in science education.

Table 6

A Listing of the Factors Represented by the Research Priorities of Science Education Researchers*

FACTOR I ANALYZING AND APPLYING LEARNING THEORY

Mean Factor Rating	Item Mean	Factor Loading	Item Number	Statements
	2.5	.78	12	Application of learning and cognitive theories to concept formation.
	3.7	.65	25	Analysis of relationship between discipline (subject matter) structure and cognitive structure of the learner.
	2.7	.63	26	Analyze strategies for acquisition, retention and transfer of problem solving (critical thinking or inquiry skills) in students.
	4.8	.59	33	Construction of a theory of science instruction.
	3.5	.58	30	Application of learning and cognitive development theories to classroom instruction.
$\bar{\bar{X}}$ = 3.41	3.3	.41	24	Identification of factors which influence formation of attitudes in students, e.g., value clarification in environmental education, attitudes toward science and technology.
	3.2	.39	8	Definition and validation of goals of science instruction, e.g., balance between process and process objectives, philosophical and theoretical basis of science instruction, articulation of goals for students at all levels, K-16.
	4.0	.38	20	Identification and design of instructional materials in subject content areas for teachers essential to support successful science instruction.
	3.0	.36	23	Identification and development of teacher education strategies (inservice and preservice) designed to facilitate professional growth and concerns of teachers, including commitment to continued growth.

FACTOR II CONDUCTING NEEDS ASSESSMENTS

Mean Factor Rating	Item Mean	Factor Loading	Item Number	Statements
	3.4	.90	4	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher materials at junior high or middle school level.
	3.5	.81	3	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at elementary level.
$\bar{\bar{X}}$ = 3.42	3.7	.75	5	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at senior high level.
	3.8	.60	6	Needs assessment of current practices as a basis of decision making for the development of science curriculum and teacher education materials at college level.
	2.7	.37	9	Identify what elements are essential in translating both research and development activities into classroom practice.

* from Yeany, R. H. and Capie, W. R. A factor-analytical study of the research priorities of science educators. Journal of Research in Science Teaching, 1978, 15 2, 167-172.

Table 6 (continued)

FACTOR III SOCIAL AND EDUCATIONAL POTPOURRI

Mean Factor Rating	Item Mean	Factor Loading	Item Number	Statements
	8.1	.58	17	Comparison of goals of science teaching today with those of 10-20 years ago as viewed by a variety of society's segments--e.g., parents, teachers, students, and teacher educators.
	5.3	.54	35	Analysis of residue effects of the NSF supported curriculum developments.
	6.7	.48	29	Analysis of factors which characterize the reluctant science teacher.
	5.6	.47	28	Influence of political and technological pressures on science instruction, science teacher manpower needs--e.g., public attitudes and science enrollments.
	4.1	.46	15	Analysis of effectiveness of instructional systems with specific goals and target populations--e.g., CBTE, PSI, Open Education, Mastery Learning, etc.
	5.6	.43	34	Identification of management skills needed for maintaining a viable learning classroom environment--e.g., discipline, grouping, bookkeeping skills.
$\bar{\bar{X}}$ = 5.35	5.8	.41	31	Description of current perceptions of middle school, high school and college graduates about the nature of life, matter and energy, about usefulness and desirability of alternative teaching modes and strategies.
	3.8	.33	22	Identification and validation of alternative evaluation schemes for teachers and pupils.
	4.0	.28	13	Analysis of decisions related to curriculum implementation--e.g., choosing, using and evaluating curriculum, including analysis of what science teachers see as key decisions.
	4.5	.27	16	Development of alternative instructional strategies for use with learners with special problems--e.g., EMR, bi-lingual, culturally deprived, non-reader, minorities, etc.

FACTOR IV DETERMINING THE EFFECTS OF ATTITUDES AND TEACHING ON LEARNING

Mean Factor Rating	Item Mean	Factor Loading	Item Number	Statements
	3.0	.60	11	Relationship between motivation, attitudes and performance (in both students and teachers).
	2.5	.60	10	Analysis of classroom teaching behaviors that facilitate science learning.
	4.4	.50	7	Identification and validation of specific teacher characteristics and knowledge which relate to successful teaching styles using enthnographic approaches.
	3.1	.44	32	Identification and validation of teaching behaviors and instructional strategies that facilitate student self-concept, knowledge and attitudes.
$\bar{\bar{X}}$ = 3.51	3.3	.40	24	Identification of factors which influence formation of attitudes in students, e.g., value clarification in environmental education, attitudes toward science and technology.
	2.9	.39	14	Identification and validation of strategies to assist preservice and inservice teachers in acquiring specific teaching skills.
	4.3	.38	19	Identification of characteristics of a professionally competent and committed teacher
	3.2	.37	27	Identification and validation of specific learner characteristics which relate to successful achievement in science.
	3.5	.30	21	Design of longitudinal studies to identify what kinds of gains are important to a variety of student populations.
	4.9	.26	18	Assessment of impact of non-school experience on students' knowledge in science, mathematics, social studies, etc.

FACTOR V DEVELOPING AND EVALUATING INTERDISCIPLINARY CURRICULA

Mean Factor Rating	Item Mean	Factor Loading	Item Number	Statements
	3.6	.73	1	Development and evaluation of instructional materials which draw from and integrate more fully sciences, social sciences, and mathematics.
$\bar{\bar{X}}$ = 4.05	4.5	.71	2	Development and evaluation of instructional materials which are integrated with non-science areas such as reading, language arts, fine arts, etc.