How to Design Effective Scientific Posters

Mohammed Nadar, PhD, OTR
Occupational Therapy Department

What is a Scientific Poster?

- A document that can communicate your research at a professional scientific meeting
- A poster is an illustrated abstract

POSTER 9

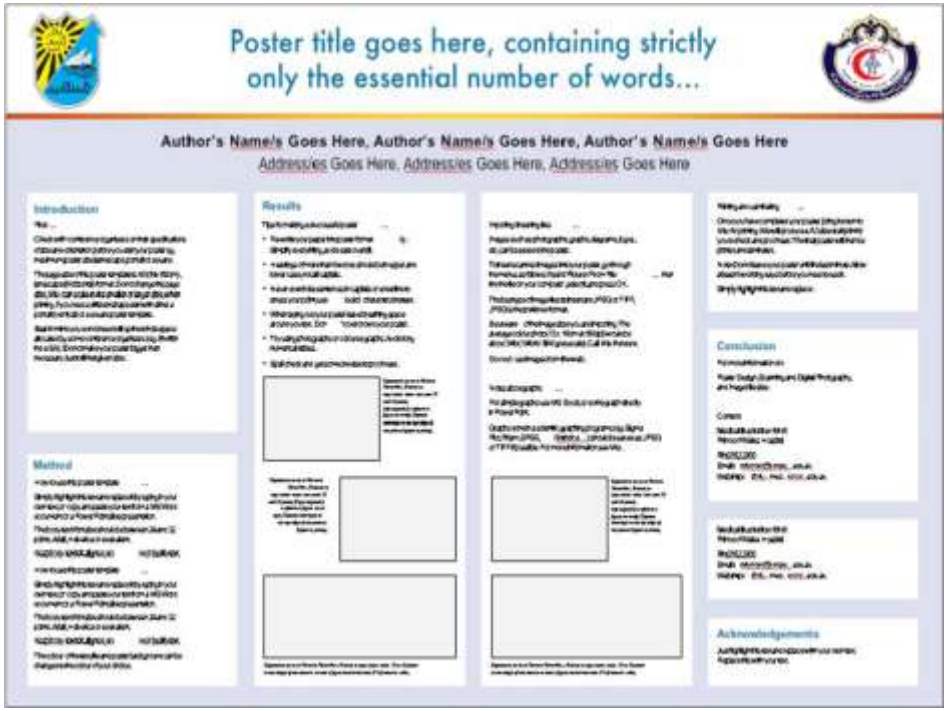
CORNELL POLYMER OUTREACH PROGRAM

POSTER SESSION

SIMULATIONS OF POLYMER NETWORKS WITH A BIMODAL CHAIN LENGTH DISTRIBUTION

Dhananjay Bhaise, Claude Cohen and Fernando Escobedo

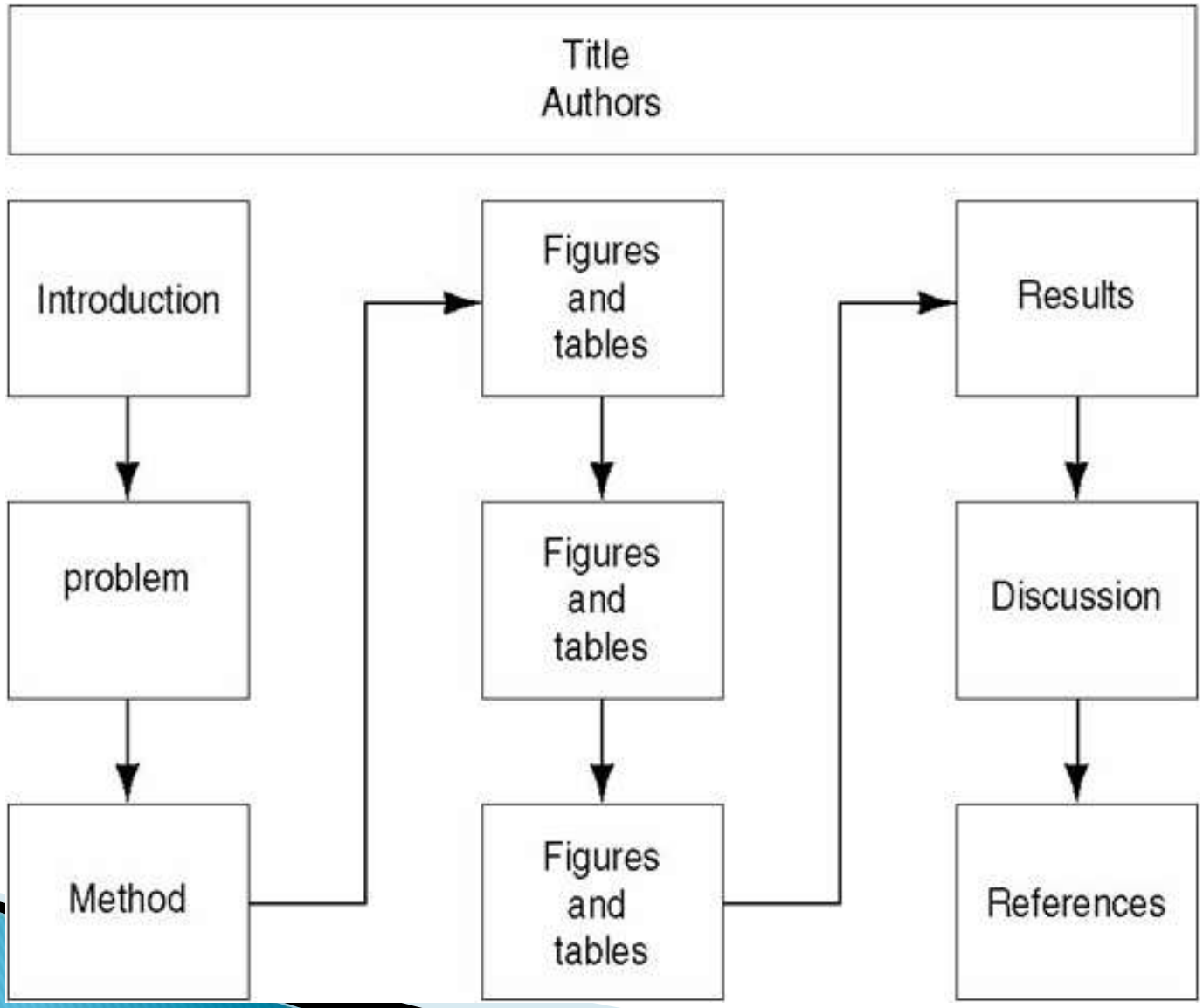
School of Chemical and Biomolecular Engineering



A Poster Can be Better Than A Talk

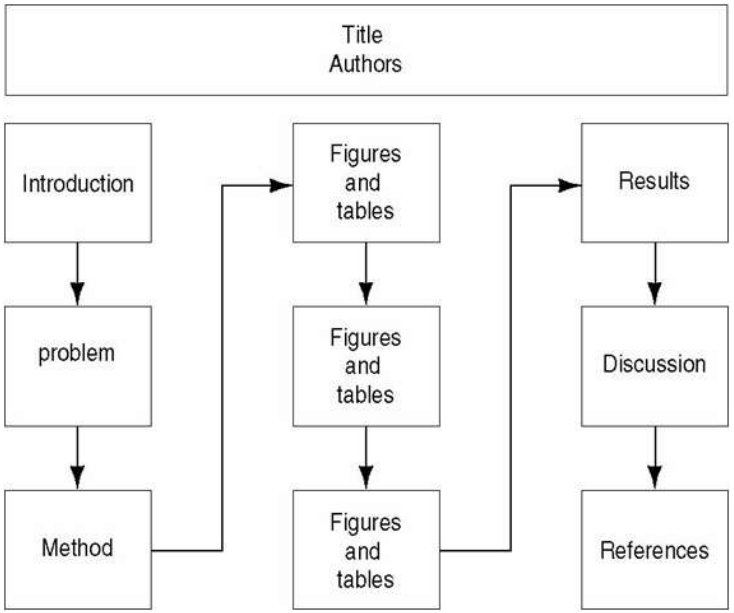
- Tremendous source of feedback
- Posters can be viewed even when you are not around
- Once you have produced a poster, you can easily take it to other conferences
- Chance to compete for a "Best Poster Prize Award”
- You can hang the poster afterward

Setup for Poster



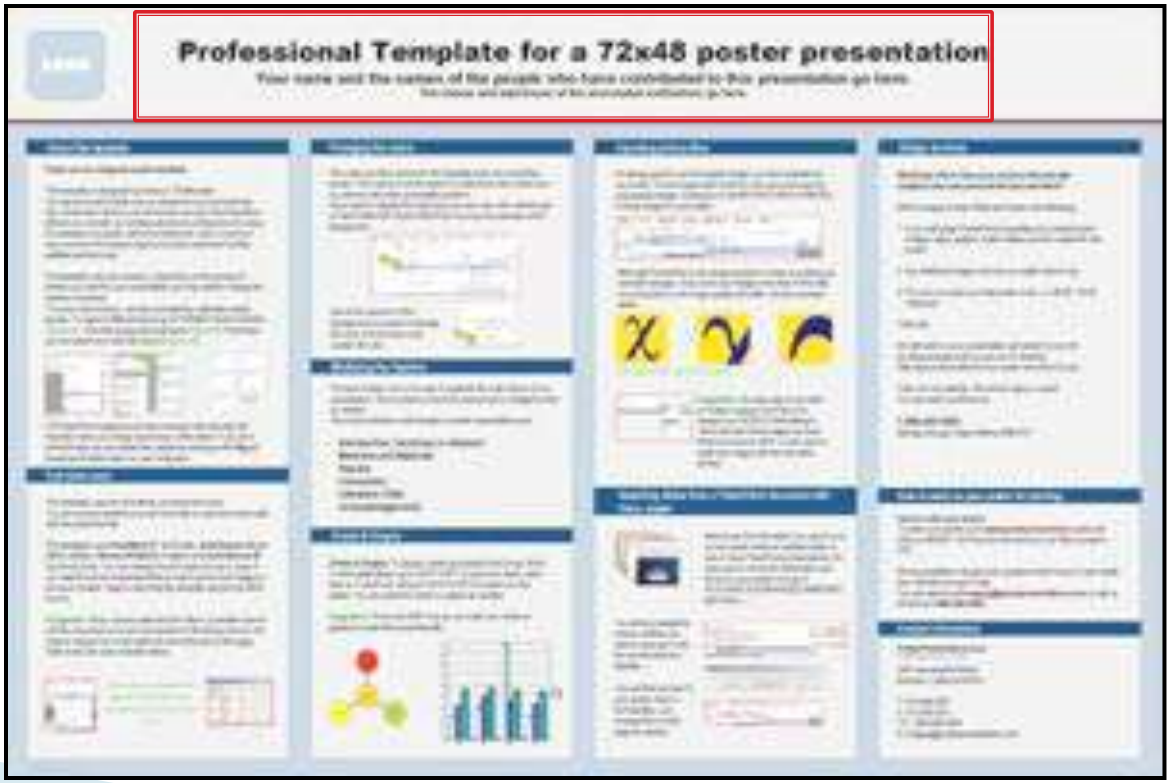
The Sections

- Title
  - Author(s)
  - Affiliation
- Introduction
- Methods (& materials)
- Results
- Discussion or conclusions
- Main references
- Acknowledgements
- Your contact information



The Title

- Your biggest impact!
- Large font size: 120 Point (Bold)
  - Really BIG title
  - Not all caps!



The Title

- Choose your words carefully
  - Usually less than 12 words
  - Maximum length: 1-2 lines
- Use declarative rather than neutral titles
  1. "The effects of Omega-3 Fatty Acid on brain function among children"
  2. "Omega-3 Fatty Acid improved brain function among children"

The Title

- Use verbs instead of abstract nouns
  - Treatment of MCP joint instability
  - Effective treatment of MCP joint instability
- Avoid abbreviations in the title
  - Effective treatment of metacarpophalangeal joint instability?

The Title

- Format the title in "sentence case“
  - e.g., "Leadership competencies in the context of health services”.
- Do not use “Title Case”
  - e.g., "Leadership Competencies in the Context of Health Services”.
- or “all caps”
  - e.g., “LEADERSHIP COMPETENCIES IN THE CONTEXT OF HEALTH SERVICES”.

~~Abstract~~ Section

- Do not include an abstract on a poster!

Evaluation Model for Self-study On-line Learning Modules

Joann Kovacich, Ph.D. and Shirley Weaver, Ph.D.

Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts

BRIGHAM AND WOMEN'S HOSPITAL

Abstract

Recognizing the complexity of web-based learning objects for instructional use, the Harvard Upper New England GEC developed a three-tiered evaluation model: (a) content review by area experts; (b) instructional design review by learning and technology specialists; and, (c) multi-disciplinary, culturally diverse, urban and rural end user satisfaction evaluation.

Content experts were given scenarios and accompanying questions designed to help solicit salient components for judging the usefulness of resource and learning material prior to a brainstorming session. Content experts were also given a brief background inventory survey in order to assess their teaching experience. Instructional designers were asked to focus on optimal technological integration for delivering web-based learning material and federally mandated compliance. The resultant content review emphasizes up-to-date evidence based educational material suitable for multi-disciplinary clinical practice in the area of geriatric mental and behavioral health. The instructional design review focuses on user-friendly navigation, ADA compliancy, and pedagogical intention. Drawing upon constructivist learning theory as applied to professional knowledge building, the end user evaluation allows for personal satisfaction reporting on both content and instructional design. After pilot-testing, Boston University's Gerontology Education Center Continuing Education Summer Seminar participants were given the end user evaluation form to review our *Alzheimer's Disease* self-study module. Out of 45 end users, 98% respondents reported that the module was worth their time and 91% would recommend it to others.

Results of our beta tests indicate that the evaluation process is best served and provides the most reliable data when each level of review is conducted by reviewers who have the specific expertise and are matched with appropriate evaluation tools. This presentation will discuss the background theories and methods used to developed each evaluation form, reviewer selection and bias, and analysis and interpretation of evaluation results. As the importance of conducting meaningful evaluations in the field of geriatric education grows, we hope to further the discussion by offering a process model that allows for content specific expansion.

Introduction

As online course offerings and teaching resources become more mature and sophisticated in both content and delivery methods, so are attempts at developing accompanying quality assurance strategies. Going beyond general-purpose evaluations (or one-size-fits-all evaluation forms), which list check-off criteria such as date, author, and institution in validity markers, current discussions focus on evaluation as process and the need to match criteria to specific contexts.[1,2] Poorly worded or inappropriate evaluation tools and/or unsuitable reviewers can have detrimental effects.

In order to address the multi-dimensions of web-based learning objects for instructional use, the Harvard Upper New England GEC developed a three-tiered evaluation model:

- Content evaluation by area experts (formative & product evaluation; guided by adult, cognitive, and context learning theories[3])
- Instructional design evaluation by learning and technology specialists (formative, compliance and product evaluation; guided by use of learning objects and accessibility theories[4,5,6])
- End-user satisfaction evaluation (formative & product evaluation; guided by constructivist learning theory[3,4,6])

Methods

Assumptions

- content review requires a special set of knowledge, practice and skills in the field of older adult mental and behavioral health
- web-based instructional design review requires a special set of knowledge, practice and skills in pedagogy and technological integration
- end-users are health care professions students and/or practitioners seeking continuing education to enhance their knowledge
- end-users lack content and instructional design expertise; end-user review is a personal satisfaction evaluation

Content & Instructional Design Teams

Two separate and independent teams were created with the express purpose to develop evaluation instruments for **upper division, interdisciplinary** self-study on-line learning modules.

Selection Process

- potential reviewers were sent introductory emails and invitations to participate with follow-up phone calls

Content Review Team

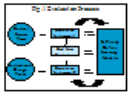
- 4 content area specialists and 3 GEC staff
- Content area specialists were selected based on their expertise in the field of older adult mental and behavioral health as demonstrated by their publications, clinical practice and participation in the Positive Aging Resource Center [7] project.
- Reviewers represented MDs and PhDs with diverse experience in clinical, traditional academic, and web-based teaching.
- Known biases: Clinical practitioners placed greater value on evidence based clinical application; Academicians placed greater value on theories and discussion of culturally competent care

Instructional Design Review Team

- 2 specialists and 3 GEC staff
- Reviewers were selected based on their expertise and experience in computer-assisted education and training, pedagogical design, user friendly technological integration, federally mandated compliance and marketing.
- Reviewers represented independent companies and academic institutions.
- Known biases: the corporate reviewer placed greater value on product marketability, available end-user technology, and real world practices; the academic reviewer placed greater value on the concept of universal access

Creation and application of assessment tools

- Brainstorming teleconference sessions were conducted with each team to identify evaluation criteria.
- Content reviewers were provided with research and teaching scenarios and accompanying questions to help solicit criteria for judging the usefulness of resource and learning material
- Each team developed an evaluation instrument which they then used to assess the on-line learning module: *Alzheimer's Disease and Related Dementias*[8]



- Informed by the content and instructional design evaluation instruments and literature review, the GEC staff created the on-line end-user personal satisfaction assessment tool.
- Boston University's Gerontology Education Center Continuing Education Summer Seminar participants served as end-user beta testers

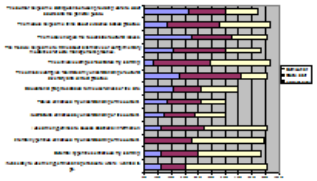
Results

Alzheimer's Disease & Related Dementias Review

- 3 out of 4 **content reviewers** found the module to be informative, current, user-friendly, and audience appropriate (suggestions for improvement included: expansion of multicultural issues; changing the pre-post test formal to multiple choice; increasing number of tables, graphs, illustrations and case studies)
- 2 out of 2 **instructional design** reviewers found the module to be user friendly, clear and consistent in design, and ADA compliant (suggestions for improvement included: increasing internal links, number of tables, graphs, illustrations, and case studies; pre-post test multiple choice format with scoring screen; and mechanism to replace out-dated hyperlinks)

End-User Review (N=43) *multidisciplinary health care professions students, practitioners, researchers, administrators, and retired professionals*

- Module completion time: Range 1-3.5 hrs; Mean 1.6 hrs (+/- 0.58 SD)
- Experience with Web-based self-instructional material: Range 0-11; Mode 2
- 98% considered the module worth his/her time
- 91% would recommend the module
- 37% stated author background was at least quite important (*5 pt scale; not at all, somewhat, quite important, very important, dazzling factor*)
- 60% stated sponsoring institution was at least quite important (*5 pt scale; not at all, somewhat, quite important, very important, dazzling factor*)



Sample End-User Comments

"The hyperlinks were amazing. I loved the fact that when I just wanted a reminder of what the 'Mini-Mental State Exam' was I could just click the link. I appreciate the fact that the information associated with the links are all up-to-date. This is a great great compliment to the module."

Sample End-User Comments Cont.

"I think the coverage of the pharmaceutical treatments were well done. It explained in a clear yet sophisticated way how the mechanisms of action worked. Nice overall feel to site – looked highly professional and well thought out."

"The links to the various kinds of exercises and tests for Alzheimer's was very useful. The ability to move in & down and through the document and the module was also very helpful. And I loved the links to graphs & tables and the U.S. Census. I really loved the whole brain atlas"

Additional Findings - Reviewers brought their own value structures to bear on the evaluation.

- Content and instructional design reviewers who were heavily invested in a particular view point or theoretical design were unable to provide objective critical reviews.
- End-users who were potential competitive authors gave poor reviews and criticized the modules' evaluation of their work.

Conclusions

Overall our findings indicate that three levels of evaluation are essential to assessing the quality of on-line self study learning resources. Content area specialists do not necessarily possess expertise in instructional design even if they have developed on-line learning materials. Likewise instructional designers and learning specialists do not have the professional backgrounds to assess content quality. And students/learner end-users should not be expected to pass judgment on whether or not the material covered is up-to-date, evidence based, of proven clinical relevance or if the references are adequate. Nor should end users be expected to comment on the pedagogical value of the on-line design. To do so places an unfair burden on the end user/student reviewer. As the importance of conducting meaningful evaluations in the field of geriatric education grows greater attention to the evaluation process and reviewer credibility is essential.

Literature cited

1. Fitzpatrick, J. 2004. Exemplars as case studies: reflections on the link between theory, practice, and context. *Amer J of Eval* 25(4): 541-559.
2. Wiley, D.A. 2002. *The Instructional Use of Learning Objects*. AIT/AECT, Indiana.
3. Mann, K.V. 2002. Thinking about learning: implications for principle-based professional education. *J of Cont Ed in the Health Professions* 22(2): 69-76
4. Teach, L. 1998. Evaluating health-related Web sites. *www.gsh.emory.edu/WELLNESS/internet.html* (September 2004)
5. Wilson, P. 2002. How to find the good and avoid the bad or ugly: a short guide to tools for rating quality of health information on the Internet. *British Medical Journal* 324(7337): 598-602.
6. Daley, B. 2001. Learning and professional practice: A study of four professions. *Adult Education Quarterly*. 52 (1): 39-54.
7. Brown, J.S., Collins, A. & Duguid, P. 1989. Situated cognition and the culture of learning. *Educational Researcher* Jan.-Feb: 32-42.
8. Jonassen, D.H., Davidson, M., Collins, M., Campbell, J., & Haag, B.B. 1995. Constructivism and computer-mediated communication in distance education. *Amer J of Distance Education*. 9(2): 7-26
9. Mazzoli, M.W. & Center, B.A. 2004. Demonstration of the effectiveness and acceptability of self-study modules in residency education. *Medical Teacher*. 26(1): 57-62
10. *Positive Aging Resource Center (PARC)* 2002. www.positiveaging.org (April 2005)
11. Kandel, R. 2004. Alzheimer's Disease and Related Dementias. *Harvard GEC*. www.geoprojects.org/harvard/harvindex.htm (April 2005)

For further information

Contact: Joann Kovacich, jkovacich@rochester.rr.com

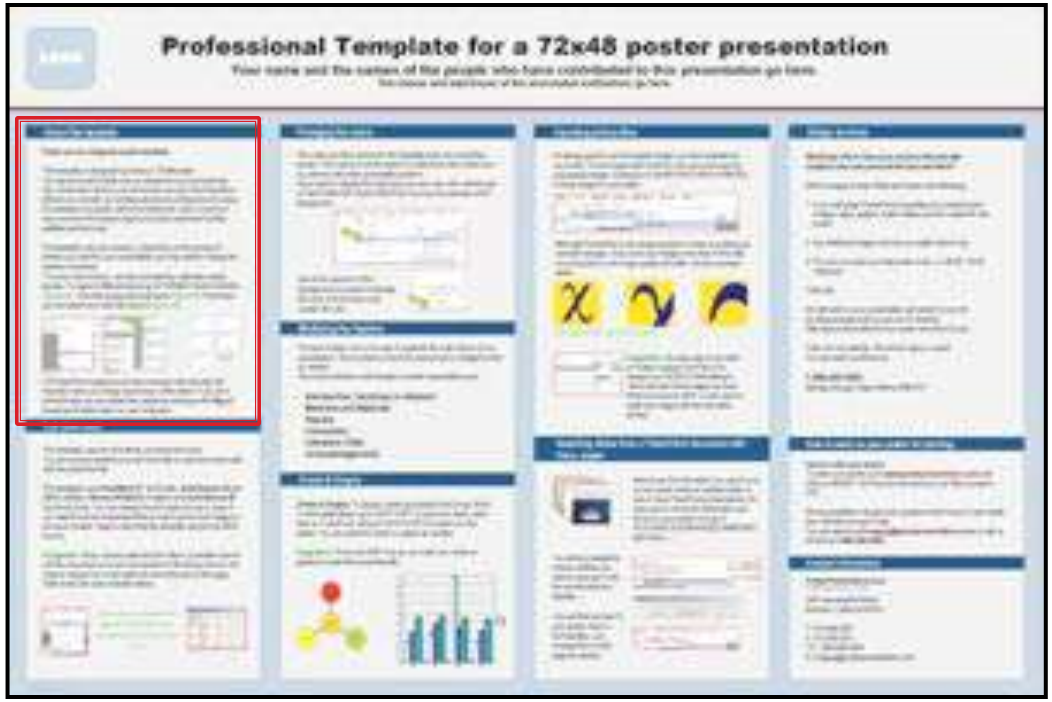
Additional material available at www.geoprojects.org/harvard

The research reported on this poster was supported by Grant No. 5D31HP70114 from the Dept. of Health & Human Services (DHHS), Public Health Service (PHS), Health Resources & Services Administration (HRSA), Bureau of Health Professions (BHPr).

The investigators retained full independence in the conduct of this research.

Introduction Section

- Statement of the problem
- Purpose
- Literature review
- Hypothesis
- Importance
- Definitions



Introduction

- Get your viewer interested while using the minimum of background information
- Literature review
  - Very brief in a poster
- Quickly place your issue in the context of published literature

Statement of the Problem

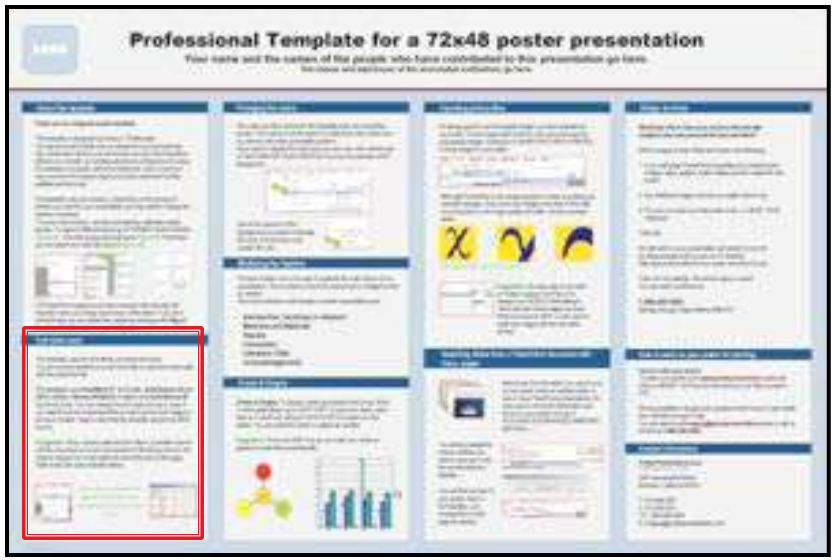
- A question (problem) is raised for which the researcher has no answer
- State the problem clearly and completely
  - Specific and narrow question
- Importance of the Study
  - Include a section contains a clear statement of purpose and rationale

Literature Review Mistakes

- Many magazines are not peer reviewed
  - Professional conferences and journals often have each article reviewed by multiple people before it is recommended for publication
- The internet can be a good source of information, but it is also full of false-science and poor research
  - The Health Sciences Center (digital) library is a good place to look for legitimate research (OVID, PubMed, …)

Methods Section

- The approaches to conducting research
- Briefly describe experimental instruments and methods
  - Not with the detail used for a manuscript
- Has several subsections
  - Subjects (Sample)
  - Instruments (materials)
  - Procedure



Subjects (Sample)

- Describes who they are
- Selection criteria
- Where they were recruited from
- Any other important information
  - Culture
  - Geographic location
  - Phenomena (personal experiences)
  - …

Inclusion Criteria

- Characteristics that the researcher wants in the sample

- Examples:
  - Studying the "Effects of Sensory Integration treatment on children" – inclusion criteria would be:
    - Child between 4 and 8,
    - Must have identified SI problems,
    - Must be getting SI treatment 2 times a week

Exclusion Criteria

- Characteristics that would exclude an individual from the study.
- Examples of exclusion criteria from the same study:
  - Child is on medications

Instruments

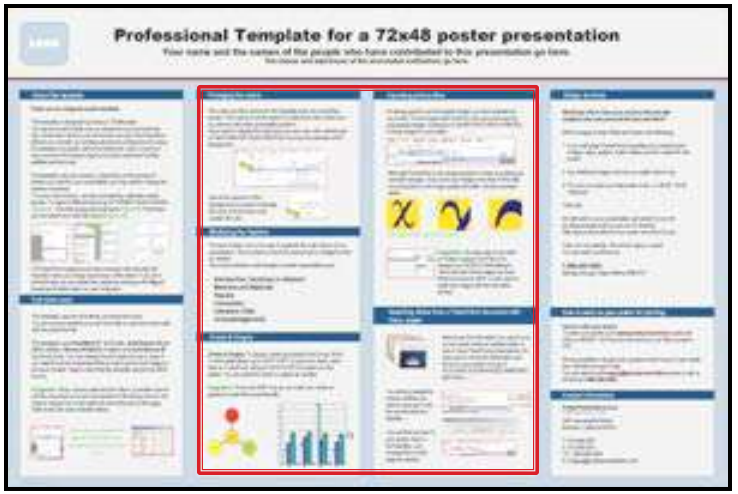
- What kind of evaluations/instruments were used in the study
  - E.g., Philips HDI 5000 ATL ultrasound machine equipped with a high-resolution curvilinear hockey-stick (10-15 MHz) linear array transducer
  - Questionnaire, assessment, …
  - Validity: success at measuring what the researchers want to measure
  - Reliability: Accuracy & consistency of the measuring instrument or procedure

Procedures

- How the study was conducted
- The process has to be clearly explained so that it can be reproduced and verified by other researchers
- If possible, use figures and tables to illustrate experimental design
- Mention statistical data analyses that were used

Results Section

- In first paragraph, mention whether the experiment worked
  - e.g., "90% of the subjects showed significant improvement in their memory”
- In the same paragraph, briefly describe the results qualitatively
  - e.g., “subjects appeared less anxious when taking the memory test”



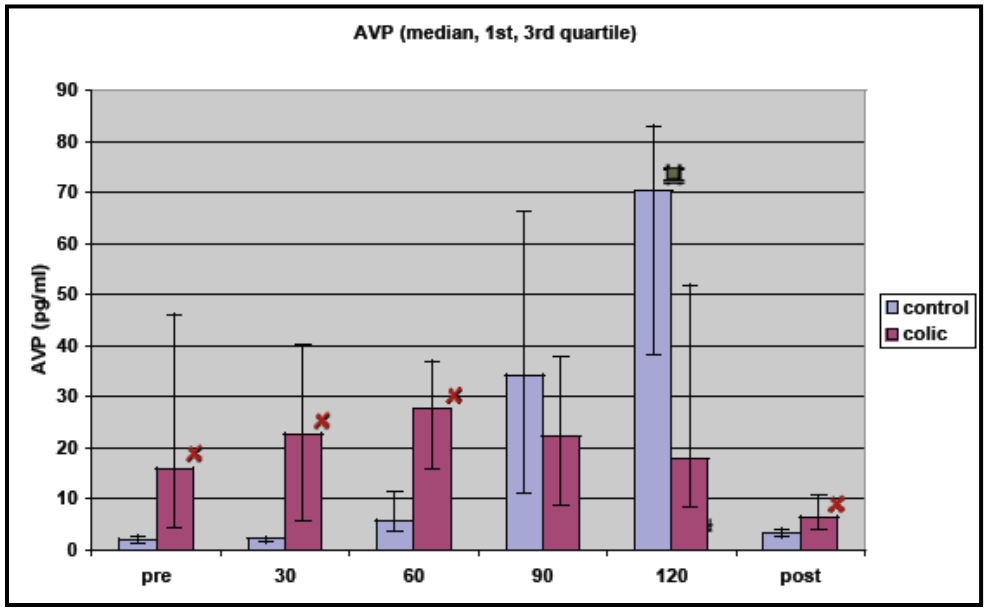
Results

- In second paragraph, begin presentation of data that more specifically addresses the hypothesis
  - Refer to supporting charts or images
- Pick the most important information
- Simple, but effective data displays
  - Images, graphs and tables can say much more than words

Effective Figures

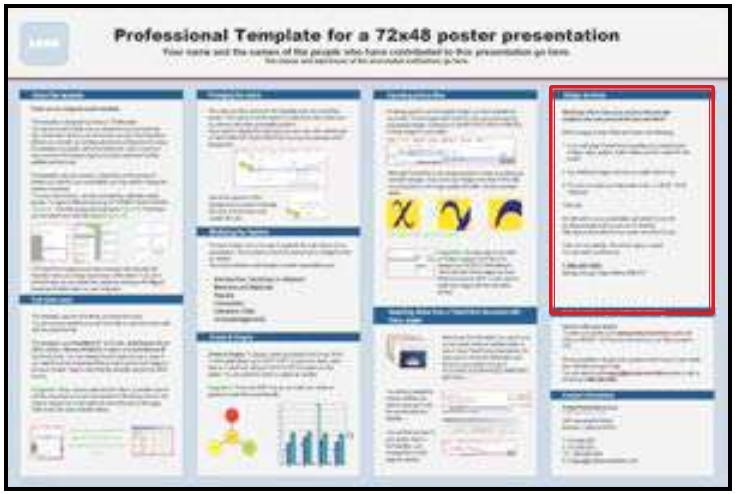
- **Title**: Short and informative
- **Self-contained**: Provide engaging figure legends that could stand on their own
- Tables are effective, but figures are better

Involvement in Retracted Publication	All Retractions, N = 463	Misconduct Retractions, n = 213	Odds Ratio of Retraction for Misconduct vs Mistake (95% CI)
Medical writer and pharmaceutical industry	2 (0.43%)	0 (0.00%)	NC
Medical writer	23 (4.97%)	3 (1.41%)	0.16 (0.05, 0.57)
Pharmaceutical industry	36 (7.78)	8 (3.76%)	0.25 (0.11, 0.58)
No pharmaceutical industry	427 (92.22%)	205 (96.24%)	3.74 (1.66, 8.40)
Single author	44 (9.50%)	26 (12.21%)	2.04 (1.01, 4.12)
First author with at least one other retraction	165 (35.64%)	94 (44.13%)	2.05 (1.35, 3.11)
First author affiliated with low/middle-income country	46 (9.94%)	28 (13.15%)	2.34 (1.18, 4.63)



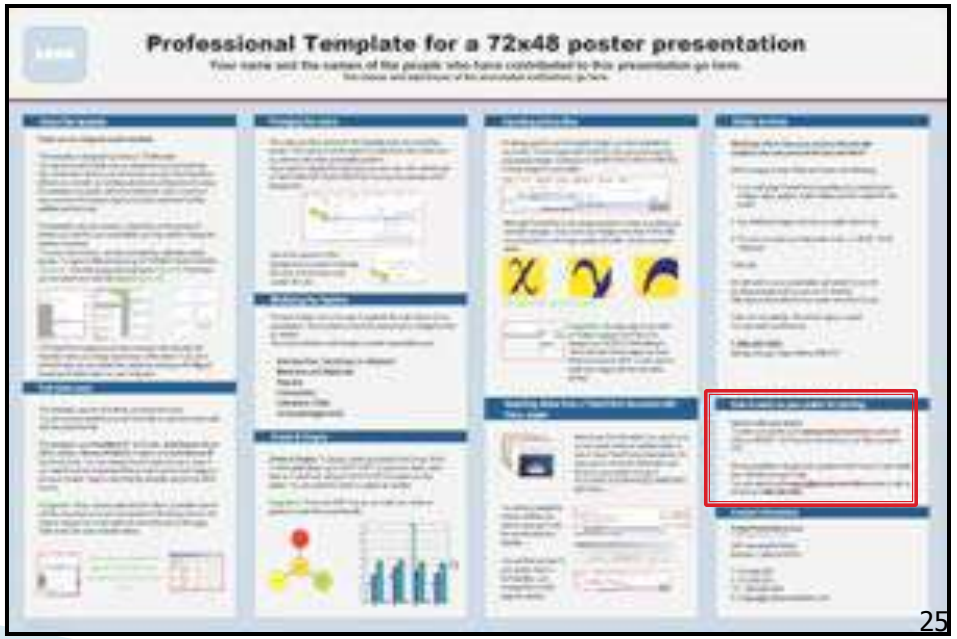
Discussion/Conclusion

- Summarize the study and draws conclusions
- State whether your hypothesis was supported
- Meaning of findings
- Relate findings to literature reviewed
- Relate findings to the real world
  - Significance or practical implication
- Suggest future research



References Section

- Cite the references used in your poster
  - Around 1-3 references
  - Only the ones you used in the poster
- Follow a standard format <u>exactly</u>

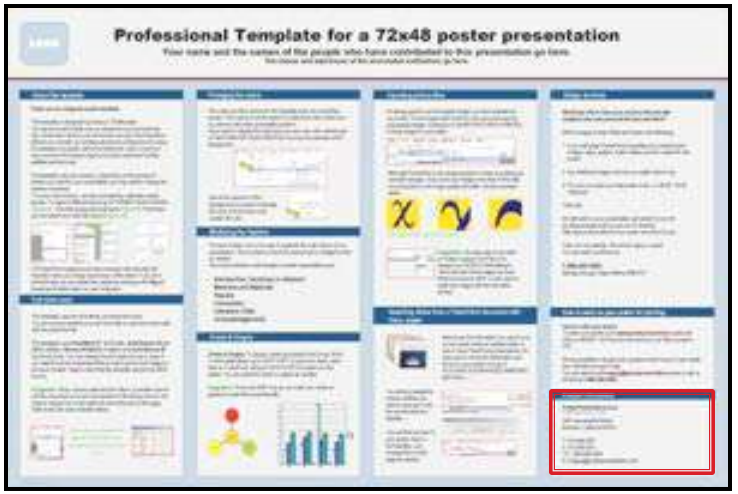


Acknowledgment Section

- Thank individuals for specific contributions to the project
  - Your mentor
  - Equipment donation
  - Statistical advice
  - Laboratory assistance
- Mention who has provided funding

Further Information

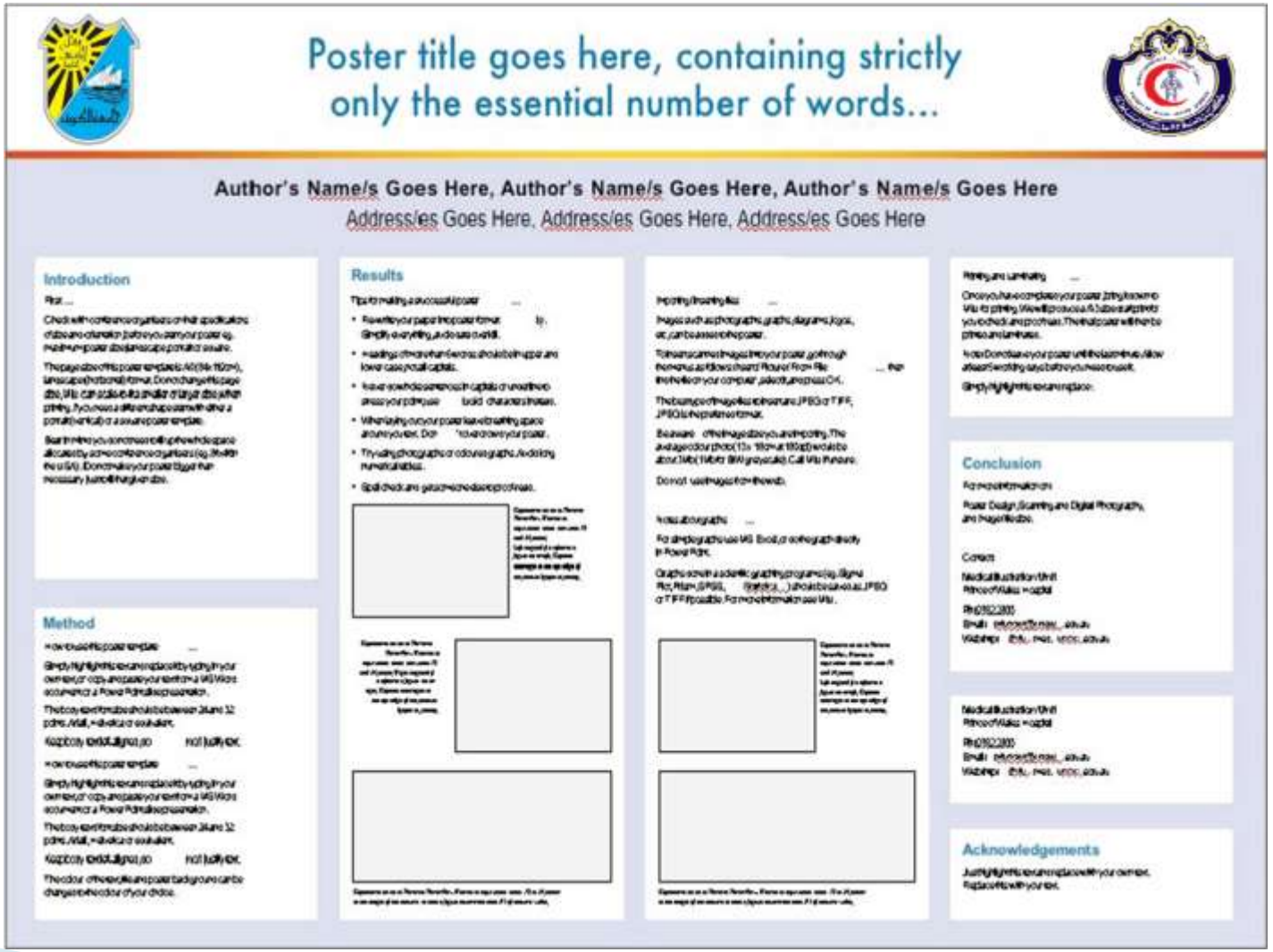
- Use this section to provide your contact information
- Your e-mail address
- Your web site address
- Perhaps a URL where they can download a PDF version of the poster



Advices for Better Posters

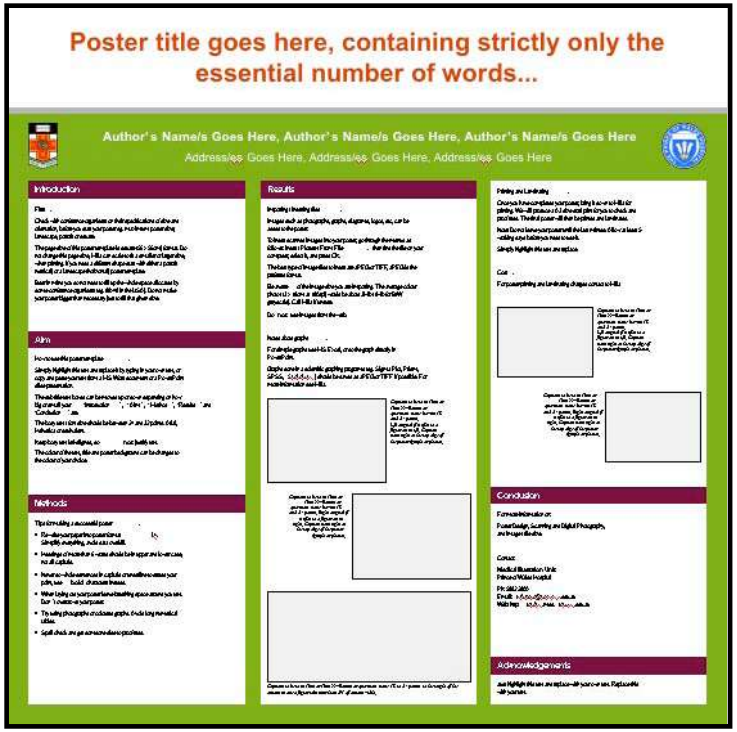
- The number one mistake is to make your poster too long
  - Densely packed, high word-count posters are basically manuscripts pasted onto a wall
- Posters with 800 words or less are ideal
- Find out the size required
  - HSC Poster board size: 115cm in width -135 cm in height
  - http://www.hsc.edu.kw/SRD2012/

Simplify Your Poster



General Text

- Leave breathing space around your text
- Use plain fonts (AVOID **FANCY fonts**)
- Same size and style font
- Left-aligned text



Tips for Visual Impact

- Print on a continuous feed printer
- Font should be readable from 1.5 meters away
- Use color to engage your readers
  - 2-3 colors, no more!
  - Contrast background with text
    - Dark type on light color background

Contrast background with text

This attracts attention but hard on the eyes

POSTER TITLE GOES HERE, CONTAINING STRICTLY ONLY THE ESSENTIAL NUMBER OF WORDS...

Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here

Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Introduction

First ...

Check with conference organisers on their specifications of size and orientation, before you start your poster eg. maximum poster size is landscape, portrait or square.

The page size of this poster template is A0 (84x 118cm) landscape (horizontal) format. Do not change the page size, MIu can scale work to a smaller or larger size when printing. If you need a different shape poster with either a portrait (vertical) or a square poster template.

Bear in mind you do not need to fill up the whole page allocated by some conference organisers (eg. 4ft wide in the USA). Do not make your poster bigger than necessary just to fill up the space.

Check with conference organisers on their specifications of size and orientation, before you start your poster eg. maximum poster size is landscape, portrait or square.

The page size of this poster template is A0

Methods

Tips for making a successful poster ...

- Re-write your paper into poster format. Be concise. Simplify everything and do not overfill.
- Headings of more than two words should be in upper and lower case, not all capitals.
- Never ever write sentences in capitals or underline to stress your points. Use bold characters instead.
- When laying out your poster leave breathing space around your text. Don't overcrowd your poster.
- Try using photographs or colour coded graphs. Avoid too many numerical tables.
- Spell check and get someone else to proof read.

Results

Importing / inserting files ...

Images such as photographs, graphs / diagrams / logos, etc, can be placed on the poster.

To insert a common image into your poster, go through the menu as follows: Insert/ Picture/ From File ... then find the file on your computer, select it and press OK.

The best type of image files are ones are JPEG or TIFF. JPEG is the preferred format.

Be aware - other image sizes you are importing. The average colour photo (13 x 18cm at 150dpi) would be about 3Mb (1Mb for B/W greyscale). Call MIu if unsure.

Do not use images from the web.

More about graphs ...

For simple graphs use MS Excel / or other graph directly in Power Point.

Graphs done in a scientific graphing programs (eg. Sigma Plot, Prism, SPSS, Statistica, ...) should be saved as JPEG or TIFF if possible. For more information see MIu.

Printing and Laminating

Printing and Laminating ...

Once you have completed your poster, bring it down to MIu for printing. We will produce A3 size draft print for you to check and proof read. The final poster will then be printed and laminated.

Hint: Do not leave your poster until the last minute. Allow at least 3 working days before you need to use it.

Simply highlight this text and replace.

Cost ...

Conclusions

For more information on:

Poster Design, Scanning and Digital Photography, and Image Resolution:

Contact:

Medical Illustration Unit
Prince of Wales Hospital

Ph: 9382 2800
Email: ...
Web: ...

Acknowledgements

Just highlight this text and replace with your own text. Replace this with your text.

Avoid Busy Backgrounds

NC STATE UNIVERSITY

Snook Growth in Habitats with Differing Abiotic Variability

Alesia Read, North Carolina State University, anread@unity.ncsu.edu

PROPOSED OBJECTIVE

To create a useful tool for assessing potential stocking habitats based on degree of variability in water quality.

- Snook are a popular game fish found in the estuarine creeks of Florida
- Snook population has been on the decline due to overfishing and habitat degradation
- Numerous stock enhancement endeavors are currently underway without sufficient preliminary research
- Abiotic variability is a prominent feature of these estuaries
- Temperature, dissolved oxygen and salinity might play influential roles in the survivorship of the juvenile snook

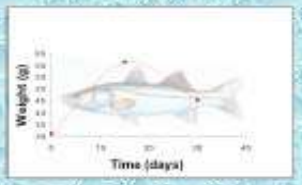
STUDY SITES

METHODS

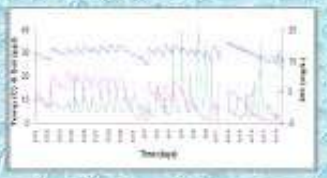
1. Juvenile snook are raised to fingerlings (100-200 mm) in the aquaculture facility
2. All snook are tagged with identifying markers for individual growth measurements
3. Fish are placed in cages within variable habitats at the research sites for 40 days
4. Fish are weighed and measured for growth

RESULTS

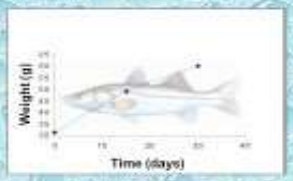
North Creek Lower (High Variability)



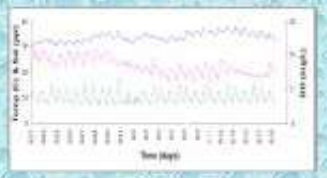
Negative Growth:
Dissolved Oxygen (mg/L)
0-22
Salinity (ppt)
2-21
Temp (°C)
25-34



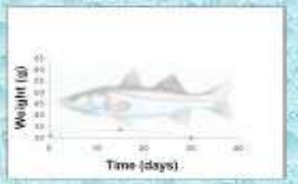
North Creek Middle (Medium Variability)



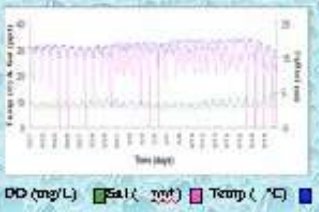
Positive Growth:
Dissolved Oxygen (mg/L)
0-8
Salinity (ppt)
16-28
Temp (°C)
30-38



North Creek Upper (Low Variability)



Slow Growth:
Dissolved Oxygen (mg/L)
0-4
Salinity (ppt)
16-30
Temp (°C)
26-33



CONCLUSION

- Snook exhibit increased growth in habitats with a medium degree of abiotic variability
- Stock enhancement projects will be more efficient by releasing juvenile snook primarily in nursery habitats with a medium degree of abiotic variability

Southern Flounder Exhibit Temperature-Dependent Sex Determination

J. Adam Luckenbach*, John Godwin and Russell Boeski
Department of Zoology, Box 7617, North Carolina State University, Raleigh, NC 27695

Introduction

Southern flounder (*Paralichthys lethostigma*) support valuable fisheries and show great promise for aquaculture. Female flounder are known to grow faster and reach larger adult sizes than males. Therefore, information on sex determination that might increase the ratio of female flounder is important for aquaculture.

Objective

This study was conducted to determine whether southern flounder exhibit temperature-dependent sex determination (TSD), and if growth is affected by rearing temperature.

Methods

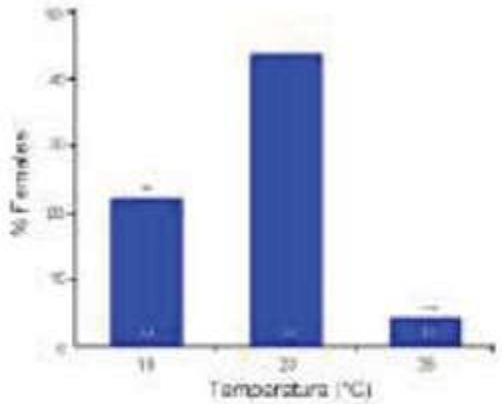
- Southern flounder broodstock were strip spawned to collect eggs and sperm for in vitro fertilization.
- Hatched larvae were weaned from a natural diet onto Artemia to high protein pelleted feed and fed until satiation at least twice daily.
- Upon reaching a mean total length of 40 mm the juvenile flounder were stocked at equal densities into one of three temperatures 18, 23, or 28°C for 245 days.
- Gonads were preserved and later sectioned at 2-6 microns.
- Sex-distinguishing markers were used to distinguish males (spermatogenesis) from females (oogenesis).

Histological Analysis

Male Differentiation

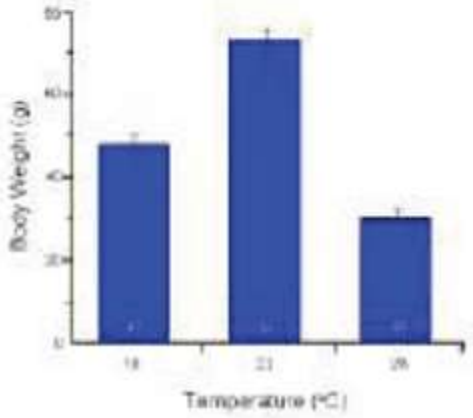
Female Differentiation

Temperature Affects Sex Determination

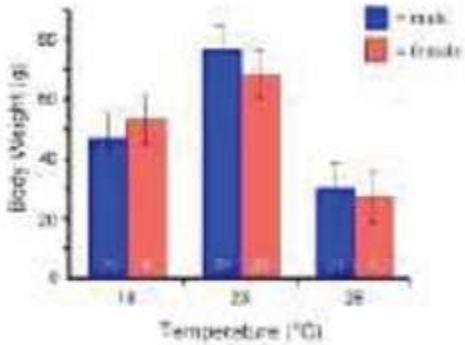


(**P < 0.01 and ***P < 0.001 represent significant deviations from a 1:1 male/female sex ratio)

Rearing Temperature Affects Growth



Growth Does Not Differ by Sex



Results

- Sex was discernible in most fish greater than 120 mm long.
- High (28°C) temperature produced 4% females.
- Low (18°C) temperature produced 22% females.
- Mid range (23°C) temperature produced 44% females.
- Fish raised at high or low temperatures showed reduced growth compared to those at the mid range temperature.
- Up to 245 days, no differences in growth existed between sexes.

Conclusions

- These findings indicate that sex determination in southern flounder is temperature-sensitive and temperature has a profound effect on growth.
- A mid-range rearing temperature (23°C) appears to maximize the number of females and promote better growth in young southern flounder.
- Although adult females are known to grow larger than males, no difference in growth between sexes occurred in age-0 (< 1 year) southern flounder.

Acknowledgements

The authors acknowledge the Advanced Research Program of the National Marine Fisheries Service and the University of North Carolina Sea Grant College Program for funding this research. Special thanks to Lee White and Beth Warren for help with the work.

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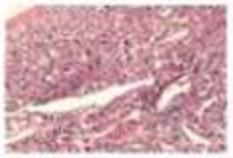
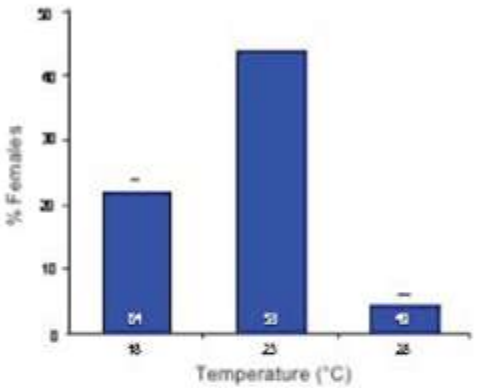


Female Differentiation

Temperature Affects Sex Determination



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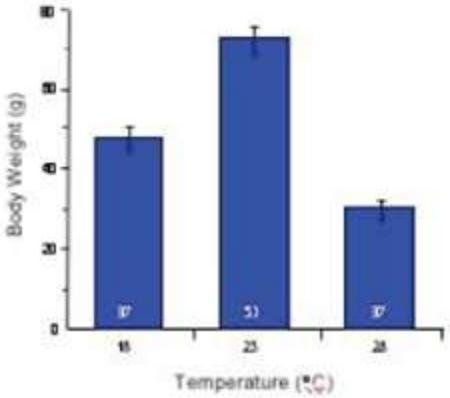

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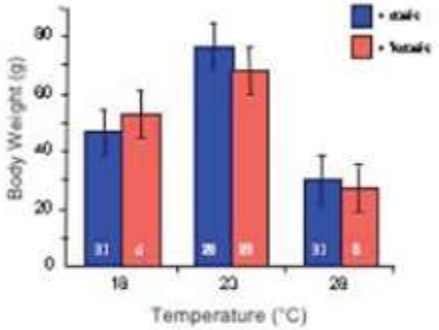

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Acknowledgements

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Print Out an A4 Size Draft

- Can you read the type?
- Are these the colors you really want?
- Does it look too busy?
- Are your points clearly visible?

- Find a friend to help you edit
  - Ask them, "What text, figure, or table could I possibly delete or modify?"

You're not done yet…

- Prepare a 3-5 minute verbal presentation
- Rehearse your presentation
- Prepare mini size poster handouts
  - Provides a written record for interested audience
  - Makes you look organized

Important Details

- Arrive early to hang your poster
- Plan for the space
- Be with your poster all of the presentation time
- Enjoy Presenting Your Poster!

Summary Characteristics of Effective Poster Presentations

- Visual appeal
- Organized
- Concise
  - A person should read your full poster in less than10 minutes
- Relevant to audience
- Rehearsed
  - Planning
  - Preparation
- Demonstrates enthusiasm