"STEM.de. – STEM.US:
Resources for Developing Real-World Competencies in German+STEM"

AATG STEM+German Articulation Grant Proposal
William B. Fischer, Portland State University, PI
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and team of preK-20 Educators

Our proposed project supports German+STEM in three ways: 1) as instruction in the individual academic subjects, and German up to and including the college level; 2) as knowledge and language proficiency for the workplace (STEM-related or generic); and 3) for exploration of career pathways accessible to learners who may not pursue the academic study of German beyond the Intermediate-High level but may well continue to learn the language in the wider world. Deliverables include not only instructional materials but also a metastructure of curriculum-mapping, teacher support resources, community outreach tools, and support for student learning about employability and job opportunities, with the ability to communicate about that in both German and English.

The project has these chief features: 1) a collection of German+STEM learning modules that can be introduced into the classroom "out of the box" and also serve as models for creation of further modules beyond the project; 2) resources that help students move toward more advanced German and STEM learning, both in formal education and in the workplace/ internships/ long-term careers; 3) resources that link German+STEM to the surrounding Germanophone culture (history of science, social studies, etc.); 4) an apparatus of assessment instruments, curriculum guidelines, implementation advice, and teacher-training resources; 5) informational resources that inform stakeholders (students, parents, school administrators, businesspeople) about the benefits of German+STEM and proficiency-oriented language learning in general.

More particularly, project highlights include: 1) model instructional units for selected STEM subject areas that represent the wider expanse of STEM subjects and, not coincidentally, those to which the German-speaking cultures have historical made a prominent contribution; 2) rigorous implementation of ACTFL & EU proficiency standards drawn from decades of teaching at the RFP's target language levels, in both K-12 and, notably, post-secondary; 3) carefully organized deployment of the specialized pedagogies of Content-Based Instruction, team-based learning, and project-based learning, also drawn from long prior experience; 4) detailed attention to preK-20 articulation principles and problems.

The project team has the following notable strengths, as documented by long-term activity: 1) specialized experience in teaching German at the range of target proficiency levels, in teaching courses related to STEM, and in the specialized pedagogies the project requires (to the level of teaching them as teacher education courses); 2) systematic experience in the production of learning materials (textbook writing, software production, media skills); 3) close familiarity with language immersion programs; 4) occupation of key positions in language teacher education programs, professional language teaching organizations, and educational entities related directly to STEM, career pathways, and definition and assessment of student learning outcomes and program effectiveness.

The core project team consists of:

1) William B. Fischer, PI – 35+ years of language teacher, with chief emphasis on lower-level German; secondary emphasis on teacher education; advanced German courses based on CBI, team-based learning, community-based learning; humanities courses about STEM, with outreach to K-12 learners; 25+ years of producing language textbooks and software; long-time member of university assessment and STEM education committees, and also of district and statement standards and assessment committees (including STEM subjects); extensive knowledge of history of science and technology; participant in first national OPI workshop for German faculty, Washington, DC, February, 1983. See website (web.pdx.edu/~fischerw) for extensive details about projects and publications, and links to long-term activities involving content-based instruction, career preparation, and STEM ("Humboldt Project", "SpeakEasy", "German for the Working World", "Sophomore Inquiry: Interpreting the Past". CV below.
2) Katja Freeborn – President of the state Association of German Teachers; experienced high-school German teacher (Aloha High School), in a cosmopolitan district that supports language learning and, particularly, STEM; CV below, and also copies of two newspaper articles describing the Aloha High School STEM curriculum and dedicated STEM lab, in place since 2007. Her primary functions are preparation of model instructional units and dissemination of grant deliverables through the state teachers' organization
3) Bernd Ferner – Facilitator of Graduate Teacher Education Program in school of education at PI's university; native speaker of German; teaching experience in German immersion school (elementary level), including STEM subject. Ed.D. expected June, 2013. CV below.
4) Heike Schütz-Malinowski, Assistant Head of School, German American School of Portland. CV on the way. Primary functions: preparation of model instructional units and field testing in classroom of younger learners.
5) Kathie Godfrey – Director of second-year German at PSU; instructor of methods courses for language teachers at PSU; Associate Director of the PSU Deutsche Sommerschule am Pazifik: liaison with key K-12 German teachers and with Lehrerfortbildungsseminar. CV below.
6) 1-2 graduate students / recent MAs in German with lower-level college German teaching experience, at least two graduate-level courses in language pedagogy, and systematic knowledge of one STEM area.

The following colleague has indicated her willingness to serve in a peripheral capacity:

Stephanie Wagner – incidental faculty participant (for monitoring curriculum mapping onto STEM content and standards); Director of the home university's Center for Science Education and member of the university STEM education committee.

GOALS

1) Provide model content-based instructional units for hands-on, project-based, team-oriented STEM learning for German at three distinct proficiency levels (Novice-High, Intermediate-Mid, Advanced-Low), for two distinct age levels (middle school, high-school juniors/seniors), for five sub-subjects (biology, etc.), and for "generic" STEM situations (everyday technology, lab, etc.). Rationale: demonstrates proof of concept for teachers and learners, and also for other stakeholders who must eventually assume support of the teaching and learning.

2) Provide vocabulary-learning resources to enhance basic Intermediate-Low proficiency to create "hothouse special" capability in STEM subjects. Rationale: the learner who has the basic language proficiency commonly achieved in K-12 immersion programs or after three years of high-school classroom study, and who also knows something of a STEM subject, can then interact socially and, to a modest extent, academically with an L1 speaker who shares that same STEM interest, as for example during junior year abroad, a short college internship, or – later on – a scientific conference.

3) Prepare teachers to find / develop more such resources by means of a kit of lesson plan criteria and the outline of STEM-oriented module to expand existing graduate level teacher education course in CBI for language teachers, including putting the resource on-line for use as an independent module or inclusion in other methods courses elsewhere. Rationale: most current language teacher education courses do not provide sufficient training in the specialized pedagogies themselves and in the production of learning materials.

4) Produce assessment tools to measure and document progress, in German and the STEM subjects, for the specific learning modules, and for important stages in the larger curriculum, with mapping onto the relevant standards (ACTFL, EU, Core Curriculum). Rationale: stakeholders are generally uninformed about language proficiency standards and related pedagogies, and also about the STEM-subject area standards; they often have wildly inaccurate notions (usually inordinately ambitious expectations) about what it means to transform a STEM course by integrating it with an L2.

5) Support language teachers who do not have strong STEM background by providing resources (background reading) to bring them up to – so to speak – the "Intermediate-Mid" level in one or more STEM subjects (i.e., the specialized knowledge possessed by the general educated populace, not the STEM specialist), and to reassure them that when they do German+STEM they will not be teaching the STEM subject at the level it would be taught in the L1. Similarly for in-place STEM teachers (and involved administrators): bring them up to – so to speak – the "Intermediate-High" level in language pedagogy, and reassure them that they do not have to be language-proficient to engage in discussions of language+STEM teaching and learning. Rationale: German+STEM cannot be created and implemented, much less expanded, in splendid isolation.

6) Improve learners' career-path knowledge (internships, college, study abroad, job-seeking) by both facilitating familiarization with programs themselves, and by providing German-language activities related to continuing study and eventual employment (compiling résumés, composing application letters, maintaining bilingual learning portfolios documenting progress in STEM knowledge and language proficiency). Rationale: 1) Most learners, and especially non-privileged ones, are much deficient in career knowledge and academic self-promotion and job-getting skills. 2) They and other stakeholders must see a practical, not just academic, benefit in doing German+STEM.

7) Link project to network of international multilingual "Alexander von Humboldt Schulen" / "Colegios Alejandro de Humboldt" and other Humboldt-named K-12 schools in US, Germany, and Latin America. Rationales: 1) cooperation on German+STEM; 2) show learners how German+STEM relates to a much wider world.

The following goals, in terms of rationale, are all related to "PR" or, more nicely put, "embedding" a German+STEM program into the wider communities (which includes, on the principle of "a rising tide raises all boats", lending to and seeking support from other languages):

8) Enhance cultural awareness with historical knowledge of the immense contribution to STEM that has been made by German-speaking cultures; chief (but not only) focus Alexander von Humboldt.

9) Make German attractive to learners not yet in the language.

10) Show other teachers and other stakeholders how LAC and CBI can be an attractive enhancement of the "core curriculum", not distracting from progress in the other subject areas, but perhaps even enhancing it.

11) Link STEM and languages to business / local economies, for example by learner activities that explore employability in German-speaking / DACH-based companies, whether in Europe or nearby.

ACTIVITIES, DRAFT BUDGET, and TIMELINE

Note: Time estimates below include only paid hours. PI contribution is unpaid. Other main team members will donate considerable time, but may be recompensed in moderate amounts as leaders of teams producing the project deliverables, but at the same rate as graduate-student participants, who will (under the supervision of PI and core team) produce many of the deliverables. Basic rate: $20/hr or, for the graduate students, graduate-level academic credit. The graduate-student participants will be selected for their German proficiency, English writing skills, familiarity with STEM subjects, and competence in language pedagogy, as demonstrated by outstanding performance in graduate teacher education courses and as teachers in the Novice-Low to Intermediate-High language classroom.

Timeline: early July 2013 – initial meeting of team; October 2013 – presentation of concept at state conference of language teachers; December, 2013– ancillaries (career pathway resources, pedagogical resources, German+STEM school network listing, STEM tutorials for language teachers, language pedagogy tutorials for STEM teachers, etc.); March 2014 – Humboldt-related learning modules; March 2014 – followup at state conference of language teachers; July 2014 – main German+STEM learning modules, assessment tools, curricular map, etc.; November 2014 – presentation at AATG/ACTFL national conference.

$00	12 hrs.	Initial meetings of core team
$300	15 hrs.	Assemble catalog of available (online) STEM-related lesson plans for US K-12 schools, with notes about conversion to German+STEM (appropriate language and age levels, suggestions about how to adapt); same for lesson plans for schools in DACH
$700	35 hrs.	Develop model lesson plans for specific STEM subjects (sustainability, biology, astronomy, archaeology, integrated project), with recipe showing teachers how to create more.
$400	20 hrs.	Develop hands-on learning activities for using German in generic STEM environments everyday computer/mobile, lab/workshop, museum / science center, and problem-solving math up through simple algebra.
$100	5 hrs.	Develop "hothouse special" vocabulary learning kit to boost STEM-vocabulary for learners with basic NH/IL German proficiency.
$200	10 hrs.	Create networks (US schools doing STEM + German; Humboldt-named schools in US, Canada, Latin America, Germany)
$200	10 hrs.	Internship, college, and career exploration kit (assembled from existing resources, but with German-learning activities added)
$200	10 hrs.	FLES / outreach kit to build interest in German+STEM (assembled from existing resource, but with framework specific to this grant)
$200	10 hrs.	"Getting to Know Alexander von Humboldt" resource and activity kit as focus for other subject areas and model for learning about other scientists (some activities in English, others either in NH-Adv German for German+STEM learners or Novice-Low German for other learners in schools doing German+STEM)
$00	10 hrs.	Project handbook for language teachers and stakeholders
$00	12 hrs	Project presentation and teacher training meetings at COFLT conferences (archived as webinar for other groups)
$200		Present at ACTFL/AATG Conference (augmented by university and department travel money)
$00		Supplies, copying, postage, media, etc. (absorbed by PI's clerical allowance and misc. department facilities)

$2500

William B. Fischer

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Teaching and Research

language pedagogy; technology in language instruction; teacher education; interaction of science, technology and humanities, popular culture

Education

1979	Ph.D., Yale University, Department of Germanic Languages and Literatures. Subject of dissertation: German science fiction; advisor: Peter Demetz
1969-70	Carnegie Teaching Fellow, Yale University
1965-69	B.A., Yale College. Double intensive major with Highest Honors in German and English. Magna cum laude, Phi Beta Kappa, National Merit Scholar
1954-65	Public schools, Grants Pass, Oregon

Academic Employment

1978-	Department of Foreign Languages, Portland State University. Promotions to Assistant Professor, 1980; Associate Professor, 1983; Professor, 1987 (check this)
1974-77	Instructor, Department of German, Emory University, Atlanta, Georgia
1969-72	Carnegie Teaching Fellow and graduate assistant, Yale University

Publications (summary list)

"Literatur für Leser and Listeners: Herbert W. Franke's 'Papa Joe & Co.'" *literatur für leser* (Peter Lang), 29.4 (4/2006).

"Goethe, Schiller and Me: Reflections on Figuring out Literature While Teaching Others about It and Life Too in a Language They Don't Talk Very Good Yet." *Teaching German in America: Past Progress and Future Promise.* Cherry Hill, NJ: American Association of Teachers of German, 2002.

¿Cómo? Introductory Spanish for Proficiency (co-author), Simon and Schuster, 1995.

Wie, bitte? Introductory German for Proficiency (co-author). New York: John Wiley, 1989.

The Empire Strikes Out: Kurd Laßwitz, Hans Dominik, and the Development of German Science Fiction 1871-1945. Bowling Green, Ohio: Bowling Green State University Popular Press, 1984.

articles in *Die Unterrichtspraxis* and *Science Fiction Studies;* reviews and article translations in *Technology and Culture, Science Fiction Studies, Die Unterrichtspraxis, German Quarterly, Science/Technology and the Humanities, Visions* (journal of the Oregon Graduate Center), *Oregon English Journal*

Chief consulting editor for 2nd edition of *Deutsch für alle* by Haas and Mathieu, New York: Wiley, 1984; manuscript reviewer for John Wiley and Sons, Inc., New York; referee for *Die Unterrichtspraxis.*

Poetry and prose in various local publications

grants, Prizes, Awards

PSU Center for Academic Excellence, AIM grant to create hybrid on-line course, 2010.

Peer review funding to support expansion of "SpeakEasy" course, 2009 ($3000).

President's Internationalization Grant and CAE Academic Innovation Mini-Grant, 2006

NCLB Grant ($50K): "Styles- and Strategies-Based Instruction for Second Languages", 2006

Pew Foundation Grant for Redesign of Large-Enrollment Courses ($200,000), 2001.

PSU Faculty Vitality Grant, 2000 ($15,000)

NEH Fellowship for College Teachers, 1982; DAAD travel grant, 1986; various university grants

co-recipient, Oregon Department of Education grant to develop core courses in training foreign language teachers (1996, $80,000)

co-recipient, Eisenhower-ODE grant to develop pilot course in multi-media use in language instruction, (1997, $16,000)

grant-supported (Eisenhower) member of three-year STEP phase of PASS, starting 5/96

Teaching in Technology award, PSU, 2005 & 1998

Recent Activity

'Echo360 Lecture Capture Software in Language Courses", invited presentation, PSU, 29 Nov., 2010.

"Binaural Stereo Sound and the German Science-Fiction Radio-Play", Seventh International Hawaii Conference on the Arts and Humanities," January 2009.

"The 'Humboldt Project:' Outreach to K-12 At-Risk Students through Experiential Learning about Sciences, Social Sciences, Humanities, Environmentalism and Sustainability", Seventh International Hawaii Conference on the Arts and Humanities," January 2009.

"Thinking outside the Curriculum Box: Three Experiments", Fifth International Hawaii Conference on the Arts and Humanities," January 2007.
"I Really Gave My Students the Business – from Business Language Course to Business Simulation to Startup Company," Spring conference of the Confederation of Oregon Foreign Language Teachers, 4 March 2006.
"Redesigning the Giant Course," refereed presentation at International Humanities Conference, Honolulu, January 2003.
Chair of Educational Testing Service national committee producing new version of German CLEP test
1994- OSSHE PASS committees
1996 Japanese Magnet Program high school site selection committee
2002 Short trip to Berlin to gather fresh cultural materials for first-year program, text & software
2006 Travel in Germany and Austria to augment materials for first-year program, text & software

Technology Experience

producer and programmer of foreign language software (image- and sound processing, databases, DTP, HTML, JavaScript)
typesetting and layout of several books
producer of language tapes for publication (studio, DAT, computer digitization)
teach departmental course in technology and language teaching (since 1983)

New Courses Developed

"SpeakEasy" (intermediate/advanced German content-based instruction course that has created a student-run business); fundamentals of literary research for graduate students in foreign languages; entire new first-year German program; German radio drama; science and technology in literature (German and European / American); several teaching methods courses for graduate and teacher certification students; Fall 1993 Freshman Seminar; technology in foreign-language teaching; "God, Gods and Goddesses in German Literature"

Other Scholarly Activity

Numerous invited conference presentations and independent workshops; extensive advice to colleagues contemplating writing textbooks; training of graduate students in textbook, tape, and software production
President, Oregon Association of Teachers of German, 1980
Chairman, Fall Conference, Confederation of Oregon Foreign Language Teachers, 1983

Language Teaching

first-year: since 1974, generally one or more sections every quarter; regular pace, accelerated, and triple-accelerated; supervisor of first-year German at PSU since 1980
second-year: since 1969, but only occasionally since 1980
third-year (language, not culture and civilization or survey of literature): since 1974, and every quarter one or more sections since 1980; currently working on a third-year comprehensive text package
translation: theological, technical German
methods for teachers: regularly since 1983; proficiency-oriented, survey of methods, assessment, CAI; often teach combined sections with French, Spanish, German, Japanese participants

Literature Teaching

400- and 500-level courses in modern German fiction; science and technology in literature; German radio drama; science fiction; European/American Enlightenment

Languages

German (ACTFL Superior); French (ACTFL Advanced-Low); Spanish (ACTFL Intermediate-Mid)

Committees & misc. service

2007ff. Portland State University Institutional Assessment Council
OSSHE computer committee
OSSHE PASS Committee
various university and departmental committees
Chair, Portland Campus Christian Ministry Board, 1998-; member, Lutheran Campus Ministry Board, 1995-; member, PSU Center for the Study of Religion board, 1997-9
Portland Public Schools Second Languages Design Team, 1998-99
member of Portland Public School project to write grant application for FLES programs and related teacher training; work with Richmond Elementary School Japanese Immersion Program
appearance as auxiliary chorus member in five productions of Portland Opera, one nationally televised
occasional sermons in my church as substitute for pastors when they are away