

Assessment of Institutionalization Map (AIM) of STEM Education at Kapi'olani Community College
— 2009 Survey Administration Results

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Background: Developing the Institutionalization Rubric for Survey Use

Dr. Tanya Renner, Professor of Psychology, Kapiolani Community College (KCC), originally participated in the development of an Institutionalization Rubric designed to baseline and strengthen the degree to which Service-Learning, as an innovation in undergraduate education, was integrated into: a. campus mission, strategic planning, and other educational reforms; b. faculty, staff, student, and institutional support; c. curricular, co-curricular and partnership development. The Service-Learning Institutionalization Rubric was developed and published by Dr. Andrew Furco in 1999 (U.C. Berkeley). Since 2000, the College has used this rubric for 3-year tactical planning for improvements in its Service-Learning Emphasis. National Campus Compact used this rubric as the basis for research on institutional civic engagement in two-year colleges (Zlotkowski, Franco, et al 2004) and minority-serving institutions (Zlotkowski, Jones, et al 2005). The Rubric also informs the “Community Engagement” classification system of the Carnegie Foundation for the Advancement of Teaching (2006-present).

In 2001, with permission, KCC adapted the Rubric to baseline and improve the degree to which International Education, as an innovation in undergraduate education, was integrated into a-c above. The Rubric was used twice with focus groups of 40-50 campus stakeholders and combined with an external review by evaluators from the American Council on Education (ACE), to design an institutionalization plan for the College's “Integrated International Education and Globalization” (IIEG) program. The IIEG program is featured in the ACE Publication, *Promising Practices: Spotlighting Excellence in Comprehensive Internationalization* (Franco and Richards, 2002) and the Jossey-Bass Publication, *International Reform Efforts and Challenges in the Community Colleges* (Franco and Richards, 2007).

In 2008, in its “Innovation through Institutional Integration” proposal to the National Science Foundation, the College stated its intention to use the Institutionalization Rubric, now called the “Assessing Institutionalization Map” (AIM) to baseline and improve the degree to which STEM Education, as an innovation in undergraduate education, was integrated into a-c above. In January 2009, AIM was adapted from a large focus group methodology to a broad, institutional, online survey. Professor Judith Kirkpatrick and Dr. John Rand refined the factors to reflect the STEM program and its status on campus, facilitated electronic distribution, and collaborated on subsequent analysis with the College's IR staff. The survey was designed to be administered every other year in 2009, 2011, and 2013.

This report summarized the results from the year 2009 administration of the survey.

Administration Procedure

An electronic version of the survey was developed and administered in February 2009 to the faculty list provided by Publication Specialist from External Affairs and University Relations at University of Hawai'i (UH) System and Center for Excellence in Learning, Teaching, and Technology (CELTT) at KCC. We obtained exemption status for our research from Internal Review Board (IRB) of UH Committee on Human Subjects (Case # 16696). We also received permission from the Chancellor at KCC to use email list to contact faculty. Several thank-you and reminder email messages were sent out to encourage participation. Participants who requested to be removed from the list were duly removed.

Out of 424 employees, a total of 188 participants replied to the online survey, a 44% response rate, amounting to 36% of the campus employees.

Respondent characteristics:

One hundred twenty-seven out of 285 (45%) teaching faculty and staff (instructors), 36 out of 105 (34%) staff, 15 out of 27 (55%) counseling faculty and staff (counselors), and five out of seven (71%) administrators responded to the survey. Figure 1 shows the distribution of employment type among all the respondents.

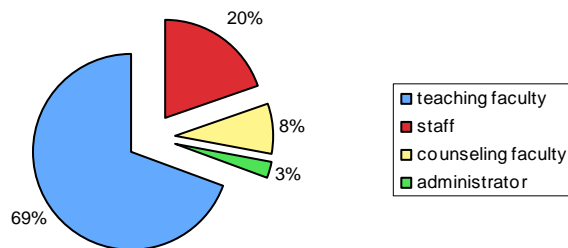


Figure 1. Distribution of Employment Type

Seventy-nine percent (144) of the respondents were full-time employees and 21% (28) were part-time employees.

In terms of length of employment, 42% of respondents were employed for more than 10 years, 24% worked between five to ten years, another 24% worked between one to five years and about 10% were employed for less than a year.

Among 127 instructional faculty and staff, a large majority (65%) of them came from Arts and Sciences, about 13% were from Allied Health Nursing, 10% from Business/Legal Education, 7% from Hospitality/Culinary, and about 5% were from the Kahikoluamea program.

Among 51 respondents who identified themselves as a support faculty and staff, 15 were student support counselors, 13 were doing administrative support, ten academic support, nine program coordinators and four librarians/media specialists.

The instrument

The AIM-STEM survey assessed the knowledge of the respondents on various aspects of the STEM program and how the respondents identified the degree of the institutionalization of the STEM program. A total of 26 items measured six aspects of STEM and its institutionalization:

- (1) philosophy and mission (Item 1- 4);
- (2) faculty and staff support (Item 5-8);
- (3) student support (Item 9-12);
- (4) partnership (Item 13-17);
- (5) institutional support (Item 18-23); and
- (6) curriculum and activities (Item 24-26).

There were additional five demographic questions asking respondents to identify their primary role at campus, full-time or part-time status, length of employment, primary program for teaching faculty and staff and primary duty for support faculty and staff. For each STEM related survey item, respondents chose one out of four options: 0 to 3. Zero meant no knowledge on the particular aspect surveyed by the item. 1 to 3 represent different levels of the institutionalization of the STEM program –

- level one: building critical mass,
- level two: building quality; and
- level three: institutionalizing.

Reliability and descriptive statistics of the AIM-STEM survey

The survey had a very high overall reliability, $r = .96$. The reliabilities for Aspect 1 to 6 separately were acceptable as well, and they were: .88, .85, .90, .95, .89, and .86, respectively. Table 1 listed the aspects and sub-aspects of STEM program surveyed and descriptive results of the responses for each item. Median responses for most items ($n = 16$) were 0, indicating at least half the respondents had no knowledge on what were surveyed in 16 out of 26 items. Only about a third (9 out of 26) items had a median of 1 or higher, but no item had a median of 3. This result showed that the institutionalization of the STEM program just start to emerge in the college, with some areas went further along the way than other areas. Taking an average of the item means of all the items under each aspect, we can see that Aspect 4: partnership ($M = .57$) was the slowest area of institutionalization, followed by Aspect 6: curriculum and activities ($M = .69$), Aspect 3: student support

($M = .96$). The areas with highest level of institutionalization were Aspect 1: philosophy and mission ($M = 1.30$) and Aspect 2: faculty and staff support ($M = 1.15$). However, in no area/aspect, the average level of institutionalization reached level two: building quality.

Table 1 Descriptive Statistics for Items on the AIM-STEM Survey

	N	Median	Mean	SD*	Skipped	0		1		2		3	
						#	%	#	%	#	%	#	%
Aspect 1. Philosophy and mission of the STEM Program (M = 1.30)													
1. Definition of the program	188	2	1.44	1.19	1	66	35%	18	10%	59	31%	45	24%
2. Strategic Planning	188	2	1.27	1.14	1	77	41%	9	5%	76	40%	26	14%
3. Alignment with Institutional Mission	186	1	1.28	1.26	3	79	42%	24	13%	34	18%	49	26%
4. Alignment with Educational Reform Efforts	187	1	1.22	1.20	2	81	43%	20	11%	49	26%	37	20%
Aspect 2. Faculty and staff support for and involvement in the STEM Program (M = 1.15)													
5. Faculty and Staff Awareness**	188	1.8	1.32	1.20	1	75	40%	18	10%	64	34%	31	16%
6. Faculty and Staff Involvement and Support***	186	0.6	0.85	0.85	3	77	41%	62	33%	44	24%	3	2%
7. Faculty and Staff Leadership	185	2	1.53	1.27	4	70	38%	4	2%	54	29%	57	31%
8. Faculty and Staff Incentives and Rewards	186	0	0.89	1.19	3	112	60%	14	8%	29	16%	31	17%
Aspect 3. Student support for and involvement in the STEM Program (M = 0.96)													
9. Student Awareness	186	1	1.12	1.12	3	83	45%	20	11%	60	32%	23	12%
10. Student Opportunities	185	1	1.04	1.10	4	88	48%	23	12%	53	29%	21	11%
11. Student Leadership	186	0	0.84	1.11	3	109	59%	22	12%	31	17%	24	13%
12. Student Incentives and Rewards	186	0	0.83	1.07	3	109	59%	15	8%	46	25%	16	9%
Aspect 4. Institutional, national and external local partnerships in the STEM Program (M = 0.57)													
13. Local Institutional Partnership Awareness	186	0	0.62	0.92	3	117	63%	32	17%	27	15%	10	5%
14. Local Partnership Awareness	185	0	0.59	0.93	4	123	66%	25	14%	27	15%	10	5%
15. National Partnership Awareness	186	0	0.55	0.88	3	126	68%	25	13%	28	15%	7	4%
16. Mutual Understanding of Partners	186	0	0.56	0.94	3	132	71%	11	6%	35	19%	8	4%
17. Voice and Collaboration with Partners	185	0	0.52	0.91	4	132	71%	18	10%	26	14%	9	5%
Aspect 5. Institutional support for the STEM program (M = 1.05)													
18. Coordinating Entity	183	0	1.05	1.24	6	101	55%	5	3%	43	23%	34	19%
19. Policy-Making Entity	185	0	0.97	1.20	4	106	57%	9	5%	40	22%	30	16%
20. Staffing	185	1	1.14	1.17	4	90	49%	4	2%	66	36%	25	14%
21. Funding	183	0	0.86	1.08	6	103	56%	21	11%	41	22%	18	10%
22. Administrative Support	181	2	1.54	1.37	8	76	42%	3	2%	30	17%	72	40%
23. Evaluation and Assessment	183	0	0.72	1.13	6	123	67%	14	8%	20	11%	26	14%
Aspect 6. Developing the STEM Program Curriculum and Related Activities (M = 0.69)													
24. Courses Certificates and Activities	186	0	0.75	1.13	3	122	66%	14	8%	24	13%	26	14%
25. Faculty	186	0	0.72	0.95	3	108	58%	31	17%	38	20%	9	5%
26. Student Learning Outcomes	183	0	0.61	1.04	6	133	73%	4	2%	30	16%	16	9%

Notes: *SD = standard deviation.

** This item was rescaled from 0 to 5 to 0 to 3. Responses fell on 0.6 and 1.2 were classified as 1, 1.8 and 2.4 were classified as 2.

*** This item was rescaled from 0 to 5 to 0 to 3. Responses fell on 0.6 and 1.2 were classified as 1, 1.8 and 2.4 were classified as 2.

None of the items were normally distributed and most of them were significantly positively skewed, indicating large number responses were clustered at the lower end of the scale, and most kurtosis values were significantly negative, meaning the distributions were flat with more people choosing extreme values on the scale than the middle values. When we study the frequency of the responses, we can see many people choose 0 and there were more people chose 2 or 3 than those chose 1. The pattern suggested that a substantial number of respondents (more than 50% in Aspect 3 to 6) had no knowledge of the elements in these aspects. For those respondents who had knowledge, they tended to think that we were at a higher level of institutionalization (Level two and three).

These results pointed to the great needs of the National Science Foundation grants in enabling the campus achieving greater level of institutionalization.

Descriptive Statistics results for different sub-populations

Survey results for different sub-populations on campus were examined according to the primary role at the college, full-time vs. part-time status, employment length, and instructional program. The results were presented as Appendix 1 to 4.

Primary roles at the college were classified as instructors, counselors, staff, and administrators. The range of the number of responses for each sub-population were 124-127 for teaching faculty, 13-15 for counseling faculty, 35-36 for staff, and five for administrator. The differences between sample sizes were very large. For this sample, staff consistently scored lower than the rest of three groups on all but two items (Item 8 and 23). But the responses from instructors, counselors and administrators were mixed as can be seen from Figure 2.

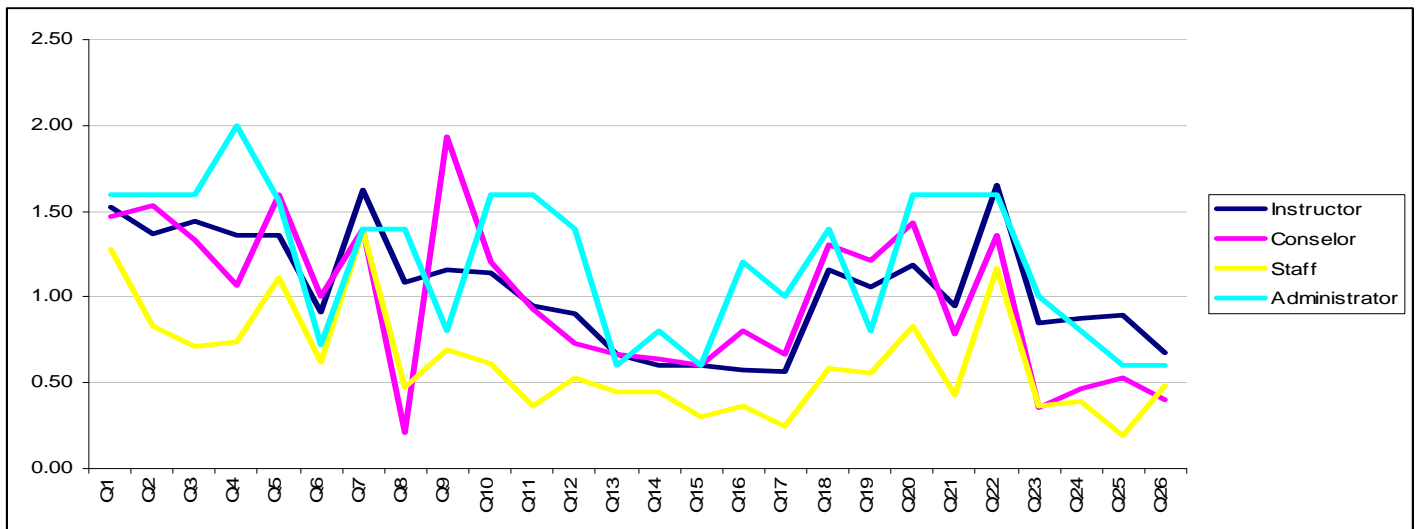


Figure 2. Average Item Scores on AIM-STEM Survey by Instructors, Counselors, Staff and Administrators

The responses ranged from 141 to 144 for full-time employees and 36 to 38 for part-time employees on the survey items. Again the sample sizes between two sub-populations were very different. Figure 3. showed that the part-time employees generally scored lower on every item save two (Item 25 and 26) on the survey.

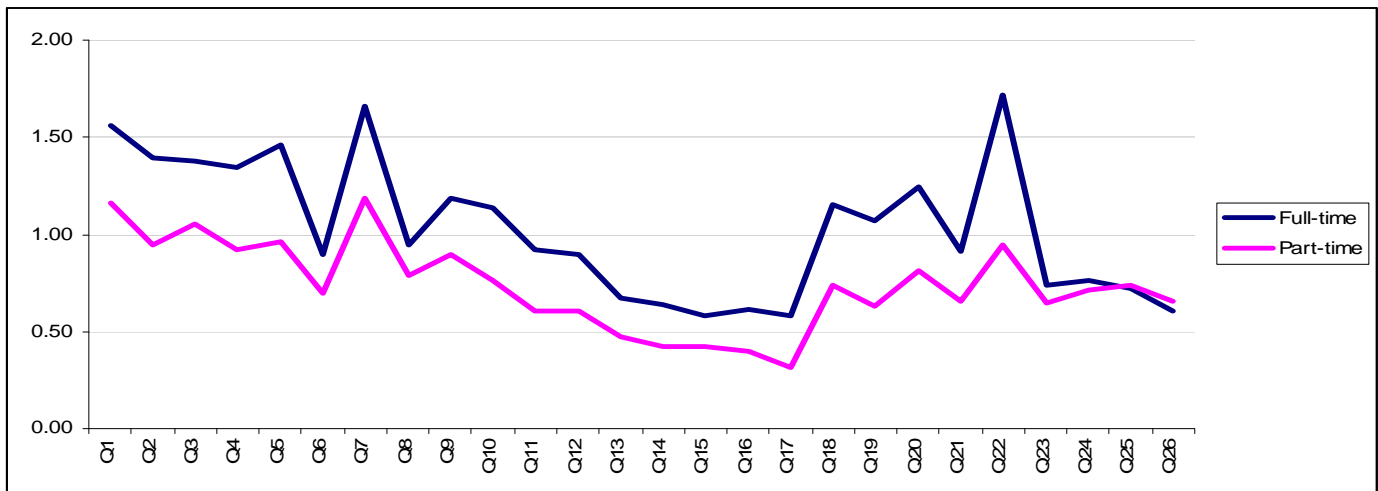


Figure 3. Average Item Scores on AIM-STEM Survey by Full-Time and Part-Time employees.

Figure 4. demonstrated that in terms of length of employment, those who had worked at the college for ten years and more scored higher and those who had worked for one year or less scored lower on large majority of the items. The sample sizes for those worked one year or less, between one and five years, between five and ten years, and more than ten years were about 18, 44, 43, and 76.

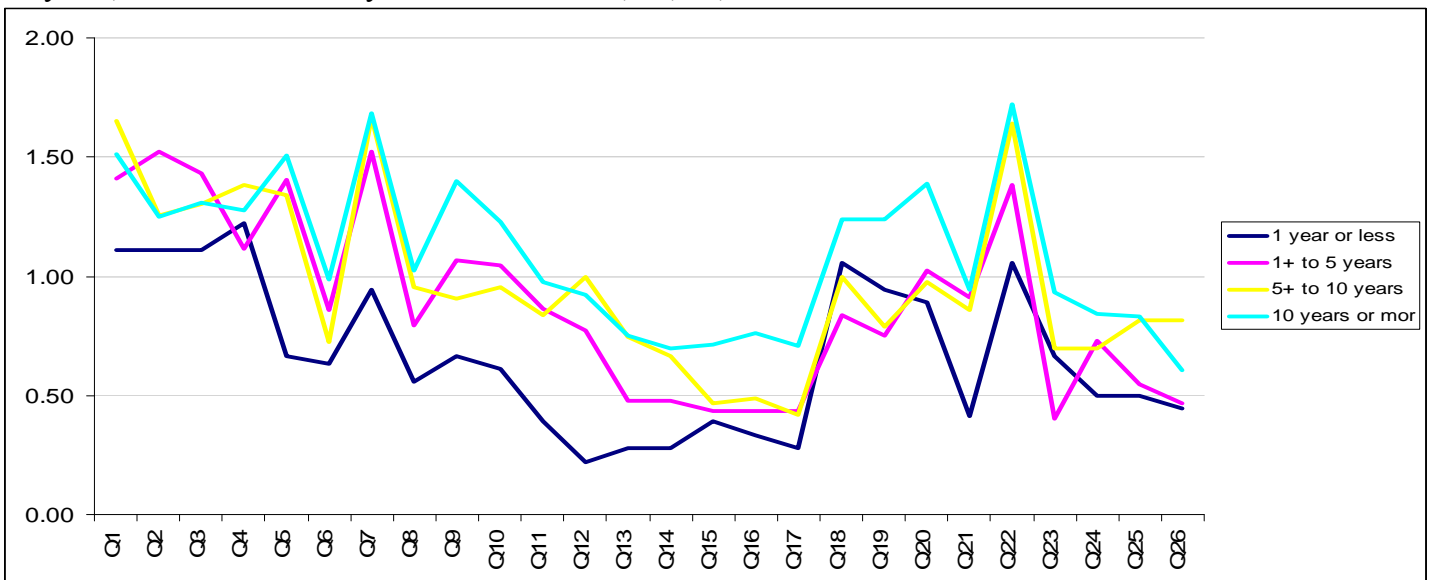


Figure 4. Average Item Scores on AIM-STEM Survey by Employees with Different Length of Employment

The last set of comparisons was conducted between teaching faculty and staff from different programs. There were 83, 6, 16, 13, and 9 respondents from Arts and Sciences, Kahikoluamea, Allied Health/Nursing, Business/Legal Education, and Hospitality/Culinary. Kahikoluamea, Business/Legal Education, and Arts and Sciences faculty and staff scored higher on majority of the items than those from Hospitality/Culinary and Allied Health/Nursing program.

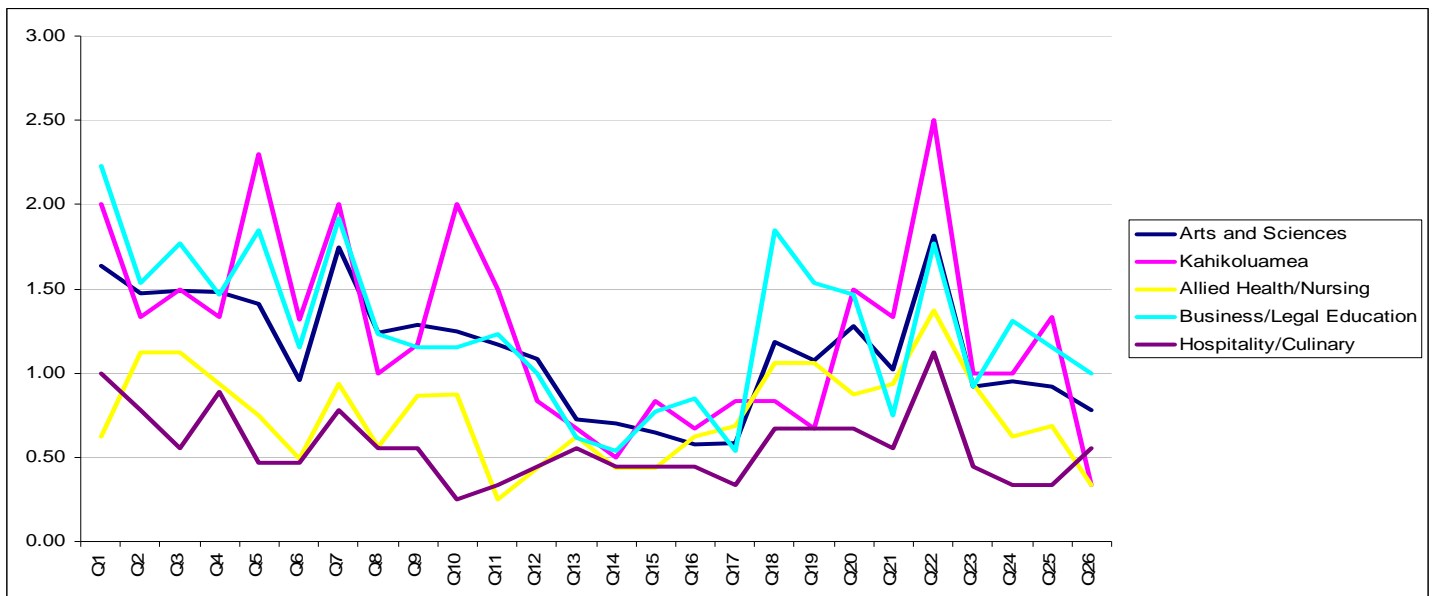


Figure 5. Average Item Scores on AIM-STEM Survey by Employees in Different Departments

Inferential statistics results for different sub-populations

Since the distribution of the item scores were not normal, non-parametric analyses were conducted using Kruskal Wallis K-independent sample tests, which were analogous to ANOVA for parametric analysis, to test group differences on each survey item. This means 26 tests (each on one of the 26 items) were conducted four times, each on different classification of the respondents, i.e. primary pole, full-time vs. part-time status, length of employment, and instructional program. This rendered 104 tests conducted. The alpha level was set to .0005 (traditional alpha level .05 divided by 104, the number of tests conducted) to be more conservative to control Type 1 error (error in identifying statistical significance when the difference is due to random chance).

The results indicated that the group differences that we identified from the descriptive statistics were not significant and the results were not generalizable to each sub-population. This was likely mainly due to the unequal sample size and small sample size overall. Therefore, the group differences that were shown in the descriptive statistics should only be used tentatively, and by no means should be used to form firm conclusions.

In addition to the item level analysis, factor analysis, principle components analysis specifically, was conducted (see more details below) to see whether the result would confirm the six constructs that the survey was trying to measure, namely, philosophy and mission, faculty and staff support, student support, partnership, institutional support, curriculum and activities. The factor structure in general resembled the survey structure as explained in the following section. Generally each factor emerged from the data represent one aspect on the survey. I used the factor score to present each aspect and conducted four multivariate ANOVA with six factor scores as dependent variables and group membership (primary pole, full-time vs. part-time status, length of employment, and instructional program) as independent variables. No group difference was found to be significant. This indicated that on the general aspect level, there were no statistical significant differences between different sub-populations in whichever classification category at the college.

Validity of the AIM-STEM survey

The convergent and divergent validity of the six aspects of the survey were investigated through factor analysis, specifically, principle components analysis. Principle components analysis was conducted to find the pattern of correlations among all the items. If all the items under one aspect correlated highly with each other, that would provide evidence for convergent validity. If the items for one aspect had lower correlation with, or we can say, independent from, the items for another aspect, that would provide divergent validity of the survey.

Principle components analysis was conducted, with varimax rotation method and pre-specified six factors to be extracted. Missing data was deleted pair-wise. The six factors accounted for 53.46%, 8.43%, 4.65%, 4.46%, 3.60%, and 3.17% of the variance in the data, respectively. The total communality (variances accounted for) by the six factors are 77.78%.

Table 2 showed the factor structure of the survey items. To show the data clearly, all the factor loadings (correlation coefficient between the item and the factor) below .40 were not shown. The items in Aspect 1 started with the “A1” in the item label; items in Aspect 2 had “A2” in the beginning of their labels; and so on. Table 2 showed that the factors extracted from principle components analysis were generally in concordance with six aspects in the survey. Factor one to six had highest correlations with Aspect 4 items (STEM partnerships), Aspect 3 items (Student support), Aspect 2 (Faculty support), Aspect 1 (Mission and Philosophy), Aspect 6 (Curriculum development), and Aspect 5 (Institutional Support), respectively.

There were several complex variables that loaded on more than one factor. For example, several items in Aspect 5 (Institutional support) also correlated with other factors. Under Aspect 5, the item on evaluation and assessment correlated with factors that represent partnership, institutional support, and curriculum and activities. This is probably because ongoing systemic evaluation and assessment requires joint effort from different institutional local partners (e.g., teachers, counselors) with institutional support (e.g. from Planning and Institutional Research Office) and external partners (external evaluator) to evaluate STEM courses and activities, the curriculum and activities piece. The item about administrative support correlated with faculty support and philosophy and mission. The item on staffing also correlated with factor that represented student support. It is not surprising that items on administrative support and staffing correlated with faculty and student support factors. And since the item on administrative support were partially about understanding of the STEM program, it is reasonable for it to correlation with philosophy and mission which also asked about the question on understanding the definition of the STEM.

Table 2. Factor Structure Table of the AIM-STEM items.

Factor Label	Factor 1 Partnership	Factor 2 Student Support	Factor 3 Faculty Support	Factor 4 Philosophy/ Mission	Factor 5 Curriculum Development	Factor 6 Institutional Support
A4E5_Vocie	0.84					
A4E1_InstitutePartnership	0.84					
A4E2LcPartnership	0.83					
A4E4_MutUnderstand	0.82					
A4E3_NatPartership	0.78					
A5E6_EvalAssess	0.54				0.48	0.43
A3E4_StIncentives		0.81				
A3E3_StLeadership		0.79				
A3E2_StOpportunities		0.73				
A3E1_StAware		0.57				
A2E4_FSIncentives		0.53				
A2E1_FSAwareness			0.79			
A2E2_FSInvlmt			0.72			
A2E3_FSLeadership			0.67			
A1E1_defi			0.57	0.49		
A1E4_AliEdReform				0.78		
A1E3_AlignMission				0.76		
A1E2_StrPln				0.63		
A6E3_SLO					0.80	
A6E1_Certificate					0.74	
A6E2_Faculty					0.65	
A5E2_PoliEnt						0.73
A5E4_Funding						0.55
A5E1_CoodinatEnt		0.45				0.53
A5E3_Staffing			0.43			0.51
A5E5_AdminSuppt			0.40	0.41		0.48

The first item in Aspect 1 about STEM definition also correlated with faculty support factor. This was probably because that there was an item in the faculty support aspect asking the number of the faculty had knowledge of the STEM program (another understanding or definition related item).

From these analyses, we can conclude that the AIM-STEM survey’s general structure was supported by both convergent and divergent validity evidence. However, there might be concepts that were overlapping through multiple items. This may not automatically threaten the validity of the survey if the construct surveyed

by the item was in itself multi-dimensional. However, we should delete unnecessary overlapping of construct through multiple items as much as possible in future revision or adaptation of the survey.

Conclusion

The AIM-STEM survey was found to be a largely satisfactory tool to evaluate the institutionalization of the STEM program at the college. It enjoyed extremely high level of reliability and its convergent and divergent validity was supported by the preliminary investigation using principle components analysis. Further improvement of the instrument may focus on several items measured multiple factors and examine whether the multi-dimensionality of these items is intended or not.

The main points of the results are:

- (1) The college overall was at very low level of institutionalization of the STEM program, which support our need for the NSF I cubed grant. None of the six aspects investigated reached building quality stage (level 2).
- (2) Several aspects were at much worse states than others. Partnership, curriculum and activities, and student support areas were even below building critical mass stage (level 1). Specific elements of these areas should be the focus of future improvement effort.
- (3) Although staff, part-time employee, those worked less than a year, Culinary/Hospitality and Business/Legal education scored lower on most or all items on the survey. These differences were not statistically significant and firm conclusions **should not** be drawn about these differences. This implies that STEM strategy committee may want to use this information to publicize STEM to those sub-groups who had the tendency scoring lower on the survey, but by no means, the results should be used for any evaluative purposes.

The reader should be warned of the potential sampling bias of the survey. In other words, we had no knowledge on why 57% of the participants did not respond to the survey and selected themselves out from taking the survey. It is quite probable that they did not answer the survey because they did not know anything about it or thought that their work might have nothing to do with it. If this were true, the reality might be that we had lower level of institutionalization than the survey suggested.

Given the potential sampling bias, the suggestion to the STEM strategy team is to use the survey result as one source of information among many. The following issues should also be considered when developing strategies in improving institutionalization of the STEM program:

- (1) effect (How easy it is to see improvement);
- (2) feasibility (How easy it is to carry out);
- (3) cost (How inexpensive it can be); and
- (4) impact (How wide the scope the influence is).

Appendix 1: Summary of STEM Survey Result—Segmenting Primary Role at the College

	N				Median				Mean				Standard Deviation			
	T	C	S	A	T	C	S	A	T	C	S	A	T	C	S	A
Aspect 1. Philosophy and mission of the STEM Program																
1. Definition of the program	127	15	36	5	2	2	1	2	1.52	1.47	1.28	1.60	1.21	1.06	1.21	1.14
2. Strategic Planning	127	15	36	5	2	2	0	2	1.37	1.53	0.83	1.60	1.14	1.19	1.06	1.14
3. Alignment with Institutional Mission	126	15	35	5	1.5	1	0	2	1.44	1.33	0.71	1.60	1.27	1.18	1.15	1.14
4. Alignment with Educational Reform Efforts	127	15	35	5	2	0	0	2	1.36	1.07	0.74	2.00	1.21	1.22	1.09	1.00
Aspect 2. Faculty and staff support for and involvement in the STEM Program																
1. Faculty and Staff Awareness	127	15	36	5	1.8	2.4	0.3	1.8	1.36	1.60	1.12	1.56	1.20	1.17	1.26	1.09
2. Faculty and Staff Involvement and Support	126	15	36	5	0.9	1.2	0	1.2	0.91	1.00	0.62	0.72	0.87	0.71	0.87	0.66
3. Faculty and Staff Leadership	125	15	36	5	2	2	2	2	1.62	1.40	1.39	1.40	1.29	1.12	1.32	1.34
4. Faculty and Staff Incentives and Rewards	127	14	36	5	0	0	0	2	1.09	0.21	0.47	1.40	1.23	0.80	0.97	1.34
Aspect 3. Student support for and involvement in the STEM Program																
1. Student Awareness	126	15	36	5	1	2	0	1	1.16	1.93	0.69	0.80	1.13	0.80	1.06	0.84
2. Student Opportunities	125	15	36	5	1	1	0	2	1.14	1.20	0.61	1.60	1.15	0.86	0.96	1.14
3. Student Leadership	127	15	36	5	0	1	0	2	0.95	0.93	0.36	1.60	1.17	1.03	0.83	1.14
4. Student Incentives and Rewards	127	15	36	5	0	0	0	2	0.91	0.73	0.53	1.40	1.12	0.88	0.91	1.34
Aspect 4. Institutional, national and external local partnerships in the STEM Program																
1. Local Institutional Partnership Awareness	127	15	36	5	0	0	0	1	0.67	0.67	0.44	0.60	0.96	0.98	0.84	0.55
2. Local Partnership Awareness	127	14	36	5	0	0	0	1	0.61	0.64	0.44	0.80	0.96	1.01	0.81	0.84
3. National Partnership Awareness	127	15	36	5	0	0	0	1	0.61	0.60	0.31	0.60	0.95	0.74	0.67	0.55
4. Mutual Understanding of Partners	127	15	36	5	0	0	0	2	0.57	0.80	0.36	1.20	0.94	1.21	0.80	1.10
5. Voice and Collaboration with Partners	126	15	36	5	0	0	0	1	0.56	0.67	0.25	1.00	0.96	0.98	0.60	1.00
Aspect 5. Institutional support for the STEM program																
1. Coordinating Entity	126	13	36	5	0	2	0	2	1.16	1.31	0.58	1.40	1.29	1.11	1.08	0.89
2. Policy-Making Entity	127	14	36	5	0	2	0	1	1.06	1.21	0.56	0.80	1.25	1.12	1.05	0.84
3. Staffing	127	14	36	5	2	2	0	2	1.19	1.43	0.83	1.60	1.22	0.94	1.08	0.89
4. Funding	126	14	35	5	0	0.5	0	2	0.95	0.79	0.43	1.60	1.13	0.89	0.88	0.89
5. Administrative Support	124	14	35	5	2	1	0	2	1.65	1.36	1.17	1.60	1.37	1.45	1.34	1.52
6. Evaluation and Assessment	125	14	36	5	0	0	0	1	0.85	0.36	0.36	1.00	1.21	0.74	0.87	1.00
Aspect 6. Developing the STEM Program Curriculum and Related Activities																
1. Courses Certificates and Activities	127	15	36	5	0	0	0	1	0.87	0.47	0.39	0.80	1.21	0.83	0.87	0.84
2. Faculty	127	15	36	5	1	0	0	1	0.90	0.53	0.19	0.60	1.01	0.92	0.47	0.55
3. Student Learning Outcomes	125	15	35	5	0	0	0	0	0.67	0.40	0.49	0.60	1.09	0.83	1.01	0.89

Notes: T = teaching faculty; C = counseling faculty; S = staff; A = administrator

Appendix 2: Summary of STEM Survey Responses—Segmenting Full-Time/Part-Time Status

	N		Median		Mean		Standard Deviation	
	FT	PT	FT	PT	FT	PT	FT	PT
Aspect 1. Philosophy and mission of the STEM Program								
1. Definition of the program	144	38	2	0	1.56	1.16	1.14	1.31
2. Strategic Planning	144	38	2	0	1.40	0.95	1.09	1.23
3. Alignment with Institutional Mission	142	38	1	0	1.38	1.05	1.23	1.30
4. Alignment with Educational Reform Efforts	143	38	1	0	1.34	0.92	1.18	1.20
Aspect 2. Faculty and staff support for and involvement in the STEM Program								
1. Faculty and Staff Awareness	144	38	1.8	0	1.46	0.96	1.18	1.20
2. Faculty and Staff Involvement and Support	143	38	1.2	0	0.90	0.69	0.83	0.92
3. Faculty and Staff Leadership	142	38	2	0	1.66	1.18	1.24	1.31
4. Faculty and Staff Incentives and Rewards	143	38	0	0	0.94	0.79	1.22	1.10
Aspect 3. Student support for and involvement in the STEM Program								
1. Student Awareness	143	38	1	0	1.19	0.89	1.10	1.17
2. Student Opportunities	142	38	1	0	1.13	0.76	1.10	1.09
3. Student Leadership	144	38	0	0	0.92	0.61	1.13	1.04
4. Student Incentives and Rewards	144	38	0	0	0.90	0.61	1.08	1.01
Aspect 4. Institutional, national and external local partnerships in the STEM Program								
1. Local Institutional Partnership Awareness	144	38	0	0	0.67	0.47	0.93	0.88
2. Local Partnership Awareness	143	38	0	0	0.64	0.42	0.94	0.88
3. National Partnership Awareness	144	38	0	0	0.58	0.42	0.88	0.88
4. Mutual Understanding of Partners	144	38	0	0	0.62	0.39	0.96	0.87
5. Voice and Collaboration with Partners	143	38	0	0	0.58	0.32	0.91	0.86
Aspect 5. Institutional support for the STEM program								
1. Coordinating Entity	141	38	0	0	1.16	0.74	1.24	1.19
2. Policy-Making Entity	143	38	0	0	1.07	0.63	1.20	1.16
3. Staffing	143	38	2	0	1.24	0.82	1.15	1.17
4. Funding	141	38	0	0	0.91	0.66	1.06	1.15
5. Administrative Support	141	36	2	0	1.72	0.94	1.33	1.35
6. Evaluation and Assessment	142	37	0	0	0.74	0.65	1.10	1.19
Aspect 6. Developing the STEM Program Curriculum and Related Activities								
1. Courses Certificates and Activities	144	38	0	0	0.76	0.71	1.12	1.14
2. Faculty	144	38	0	0	0.72	0.74	0.90	1.12
3. Student Learning Outcomes	141	38	0	0	0.60	0.66	1.02	1.15

Notes: FT = full-time; PT = part-time

Appendix 3: Summary of STEM Survey Result—Segmenting Length of Employment at the College

	N				Median				Mean				Standard Deviation			
	0-1	1 ⁺ -5	5 ⁺ -10	10 ⁺	0-1	1 ⁺ -5	5 ⁺ -10	10 ⁺	0-1	1 ⁺ -5	5 ⁺ -10	10 ⁺	0-1	1 ⁺ -5	5 ⁺ -10	10 ⁺
Aspect 1. Philosophy and mission of the STEM Program																
1. Definition of the program	18	44	43	76	0	2	2	2	1.11	1.41	1.65	1.51	1.37	1.15	1.23	1.16
2. Strategic Planning	18	44	43	76	0	2	2	2	1.11	1.52	1.26	1.25	1.32	1.19	1.09	1.10
3. Alignment with Institutional Mission	18	44	43	74	0	1	1	1	1.11	1.43	1.30	1.31	1.45	1.35	1.23	1.18
4. Alignment with Educational Reform Efforts	18	44	42	76	0	1	1.5	1.5	1.22	1.11	1.38	1.28	1.44	1.20	1.21	1.16
Aspect 2. Faculty and staff support for and involvement in the STEM Program																
1. Faculty and Staff Awareness	18	44	43	76	0	1.8	1.8	1.8	0.67	1.40	1.34	1.51	1.91	2.13	1.99	1.91
2. Faculty and Staff Involvement and Support	17	44	43	76	0	0.6	0.6	1.2	0.64	0.86	0.73	0.99	1.75	1.42	1.37	1.38
3. Faculty and Staff Leadership	17	44	42	76	0	2	2	2	0.94	1.52	1.67	1.68	1.34	1.36	1.20	1.22
4. Faculty and Staff Incentives and Rewards	18	44	43	75	0	0	0	0	0.56	0.80	0.95	1.03	0.98	1.21	1.23	1.22
Aspect 3. Student support for and involvement in the STEM Program																
1. Student Awareness	18	44	43	75	0	1	0	2	0.67	1.07	0.91	1.40	1.14	1.13	1.04	1.12
2. Student Opportunities	18	43	43	75	0	1	1	1	0.61	1.05	0.95	1.23	0.92	1.13	1.07	1.15
3. Student Leadership	18	44	43	76	0	0	0	0	0.39	0.86	0.84	0.97	0.85	1.19	1.04	1.18
4. Student Incentives and Rewards	18	44	43	76	0	0	0	0	0.22	0.77	1.00	0.92	0.65	1.03	1.11	1.14
Aspect 4. Institutional, national and external local partnerships in the STEM Program																
1. Local Institutional Partnership Awareness	18	44	43	76	0	0	0	0	0.28	0.48	0.74	0.75	0.67	0.85	0.93	1.01
2. Local Partnership Awareness	18	44	42	76	0	0	0	0	0.28	0.48	0.67	0.70	0.67	0.88	0.95	0.99
3. National Partnership Awareness	18	44	43	76	0	0	0	0	0.39	0.43	0.47	0.71	0.78	0.76	0.83	0.99
4. Mutual Understanding of Partners	18	44	43	76	0	0	0	0	0.33	0.43	0.49	0.76	0.77	0.82	0.88	1.07
5. Voice and Collaboration with Partners	18	44	43	75	0	0	0	0	0.28	0.43	0.42	0.71	0.67	0.87	0.73	1.05
Aspect 5. Institutional support for the STEM program																
1. Coordinating Entity	17	43	43	75	0	0	0	1	1.06	0.84	1.00	1.24	1.34	1.21	1.23	1.25
2. Policy-Making Entity	18	44	43	75	0	0	0	1	0.94	0.75	0.79	1.24	1.39	1.16	1.10	1.22
3. Staffing	18	44	43	75	0	0	0	2	0.89	1.02	0.98	1.39	1.18	1.13	1.14	1.20
4. Funding	17	44	43	74	0	0	0	0	0.41	0.91	0.86	0.95	0.80	1.07	1.08	1.15
5. Administrative Support	17	42	42	75	0	1	2	2	1.06	1.38	1.64	1.72	1.34	1.43	1.36	1.35
6. Evaluation and Assessment	18	42	43	75	0	0	0	0	0.67	0.40	0.70	0.93	1.19	0.80	1.15	1.23
Aspect 6. Developing the STEM Program Curriculum and Related Activities																
1. Courses Certificates and Activities	18	44	43	76	0	0	0	0	0.50	0.73	0.70	0.84	1.04	1.11	1.15	1.17
2. Faculty	18	44	43	76	0	0	0	0	0.50	0.55	0.81	0.83	1.04	0.85	0.93	1.00
3. Student Learning Outcomes	18	43	43	74	0	0	0	0	0.44	0.47	0.81	0.61	1.04	0.93	1.22	1.00

Note: 0-1 = Employed one year or less; 1⁺-5 = Employed more than one year to five years;

5⁺-10 = Employed more than five years to ten years; 10⁺ = Employed more than one year to five years

Appendix 4: Summary of STEM Survey Result—Segmenting Primary Program for Instructional Faculty at the College

	N					Median					Mean					Standard Deviation				
	AS	K	AN	BL	HC	AS	K	AN	BL	HC	AS	K	AN	BL	HC	AS	K	AN	BL	HC
Aspect 1. Philosophy and mission of the STEM Program																				
1. Definition of the program	83	6	16	13	9	2	2	0	3	1	1.64	2.00	0.63	2.23	1.00	1.16	1.10	1.02	1.17	1.00
2. Strategic Planning	83	6	16	13	9	2	2	0	2	0	1.47	1.33	1.13	1.54	0.78	1.09	1.03	1.36	1.20	0.97
3. Alignment with Institutional Mission	82	6	16	13	9	2	1.5	0.5	2	0	1.49	1.50	1.13	1.77	0.56	1.26	1.38	1.31	1.30	1.13
4. Alignment with Educational Reform Efforts	83	6	16	13	9	2	1	0	2	0	1.48	1.33	0.94	1.46	0.89	1.16	1.37	1.29	1.33	1.17
Aspect 2. Faculty and staff support for and involvement in the STEM Program																				
1. Faculty and Staff Awareness	83	6	16	13	9	1.8	2.7	0	2.4	0	1.41	2.30	0.75	1.85	0.47	1.15	1.16	1.06	1.35	0.94
2. Faculty and Staff Involvement and Support	83	5	16	13	9	1.2	1.8	0	1.2	0	0.96	1.32	0.49	1.15	0.47	0.83	0.78	0.83	1.02	0.94
3. Faculty and Staff Leadership	82	6	16	12	9	2	2	0	2	0	1.74	2.00	0.94	1.92	0.78	1.27	1.10	1.29	1.24	1.20
4. Faculty and Staff Incentives and Rewards	83	6	16	13	9	1	0	0	1	0	1.24	1.00	0.56	1.23	0.56	1.25	1.55	0.96	1.30	1.13
Aspect 3. Student support for and involvement in the STEM Program																				
1. Student Awareness	83	6	15	13	9	2	1	0	1	0	1.29	1.17	0.87	1.15	0.56	1.14	1.33	0.99	1.21	0.88
2. Student Opportunities	82	6	16	13	8	1	2	0.5	2	0	1.24	2.00	0.88	1.15	0.25	1.20	1.10	1.02	0.99	0.46
3. Student Leadership	83	6	16	13	9	1	2	0	1	0	1.17	1.50	0.25	1.23	0.33	1.22	1.22	0.77	1.17	0.50
4. Student Incentives and Rewards	83	6	16	13	9	1	0	0	0	0	1.08	0.83	0.44	1.00	0.44	1.14	1.33	0.96	1.22	0.73
Aspect 4. Institutional, national and external local partnerships in the STEM Program																				
1. Local Institutional Partnership Awareness	83	6	16	13	9	0	0	0	0	0	0.72	0.67	0.63	0.62	0.56	0.98	1.03	0.89	0.96	0.88
2. Local Partnership Awareness	83	6	16	13	9	0	0	0	0	0	0.70	0.50	0.44	0.54	0.44	1.02	1.22	0.63	0.88	0.73
3. National Partnership Awareness	83	6	16	13	9	0	0	0	0	0	0.65	0.83	0.44	0.77	0.44	0.99	1.33	0.73	0.93	0.73
4. Mutual Understanding of Partners	83	6	16	13	9	0	0	0	0	0	0.58	0.67	0.63	0.85	0.44	0.94	1.03	1.02	1.14	0.73
5. Voice and Collaboration with Partners	82	6	16	13	9	0	0	0	0	0	0.59	0.83	0.69	0.54	0.33	0.97	1.33	1.01	0.88	0.50

	N					Median					Mean					Standard Deviation				
	AS	K	AN	BL	HC	AS	K	AN	BL	HC	AS	K	AN	BL	HC	AS	K	AN	BL	HC
Aspect 5. Institutional support for the STEM program																				
1. Coordinating Entity	82	6	16	13	9	0.5	0	0	2	0	1.18	0.83	1.06	1.85	0.67	1.27	1.33	1.29	1.34	1.00
2. Policy-Making Entity	83	6	16	13	9	0	0	0	2	0	1.07	0.67	1.06	1.54	0.67	1.25	1.03	1.29	1.33	1.00
3. Staffing	83	6	16	13	9	2	2	0	2	0	1.28	1.50	0.88	1.46	0.67	1.21	1.22	1.20	1.27	1.00
4. Funding	83	6	16	12	9	1	1.5	0	0	0	1.02	1.33	0.94	0.75	0.56	1.13	1.21	1.29	0.97	0.88
5. Administrative Support	80	6	16	13	8	2	3	1	3	1	1.81	2.50	1.38	1.77	1.13	1.32	1.22	1.45	1.48	1.25
6. Evaluation and Assessment	83	6	15	12	9	0	0	0	0	0	0.92	1.00	0.93	0.92	0.44	1.22	1.55	1.16	1.38	1.01
Aspect 6. Developing the STEM Program Curriculum and Related Activities																				
1. Courses Certificates and Activities	83	6	16	13	9	0	0	0	0	0	0.95	1.00	0.63	1.31	0.33	1.22	1.55	1.02	1.49	0.71
2. Faculty	83	6	16	13	9	1	2	0	0	0	0.92	1.33	0.69	1.15	0.33	0.95	1.03	1.14	1.34	0.50
3. Student Learning Outcomes	82	6	15	13	9	0	0	0	0	0	0.78	0.33	0.33	1.00	0.56	1.14	0.82	0.72	1.35	1.13

Notes:

AS = Arts and Sciences

K = Kahikoluamea

AN = Allied Health/Nursing

BL = Business Education/Legal

HC = Hospitality/Culinary